FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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Flight.

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EDITORIAL COMMENT.

The Proposed Atlantic Flight.

At the present moment a main topic of discussion among people directly interested in aviation is the proposed Atlantic flight and the possibility of its being achieved this year. For our own part, we have been inclined to favour 1915 as more likely to see the crossing made, rather than 1914, but there are others who apparently are now more sanguine of the present year being the one which is to mark this further notch in aviation history. On balance, indeed, we think that there *are* possibilities of its being accomplished before the end of the coming summer.

In arriving at this conclusion we have been largely influenced by what we have learnt of the organisation of the attempt with which Lieut. Porte will be associated, financially backed by Mr. Wanamaker. In the light of recent performances in the air, it must be at once admitted that there is nothing physically impossible—we had almost said there is nothing particularly difficult—in a sustained flight of the distance between Newfoundland and the Irish coast, but then this Atlantic flight is a rather different proposition to mere circuit flying. All sorts and conditions of meteorological changes have to be reckoned with, and all sorts of contingencies taken into account which are not likely to arise in the average case, and which, even though they were to arise, would not have the serious consequences that are bound to ensue if they take place in mid-Atlantic. That being so, there is absolutely nothing that can be left to chance. The machine on which the attempt is to be made must be of the best in every detail; things must be calculated with a scientific accuracy quite unnecessary in another case; the men must not only be skilled aviators, but navigators of more than average attainments; and, above all, there must be the money behind it all in sufficient quantity to make certain that nothing, down to the last detail, has had to be neglected for want of funds. In the case of the one announced attempt which is so far to be taken seriously, that which is being financed by Mr. Wanamaker, every one of the essentials has been provided. There is unlimited money behind the attempt. The Curtiss air-boat is a most suitable craft in every way. Lieut. Porte, who is to have charge of the actual flight, is an aviator of long experience, in addition to which he will probably have as his colleague an American naval officer, who has yet to be chosen. Humanly speaking, the organisation will be as perfect as knowledge and experience can make it. So far as is possible, therefore, all the elements of success are there, and, barring accidents, we believe that success may be achieved.

We have recently seen Lieut. Porte, and talked over the proposed flight with him. He is quietly confident of being able to accomplish the projected flight. According to what we gathered from him in the course of our interview, the machine will actually be ready some time in June, but it is not anticipated that the actual flight will take place before the middle of August, when the weather conditions are usually more favourable than at any other time of the year. He expects to accomplish the journey—if it is to be done at all—in a single day, and without alighting. So much for the details of the flight as far as they have been arranged.

One point that is worthy of passing notice is that it has been seriously proposed in America that the conditions of the flight for the *Daily Mail* prize should be modified so as to admit of there being an actual race across the Atlantic between several machines, and that the Governments of Great Britain and the United States should be asked to provide a warship patrol of the route. There is something in the idea in the abstract, but we really do not think that any good cause has been shown why the existing conditions should be altered, at

any rate yet. As we conceive it, the prize is offered to encourage serious aviation, and it would be in no way in accord with the spirit of the thing to encourage risky experiments. As we have pointed out, success can only come with perfect organisation, which entails the expenditure of money. In fact, the conditions of such a flight are so onerous as to their preparation that even supposing the prize to be won, the man behind it will find himself out of pocket at the end. So far, there is only the one project extant which complies with these requirements. The people concerned are going into it with their eyes open, and prepared to accept the conditions as they stand. Therefore, at the moment there seems to be no reason for modification in order to let in those who are prepared to take extraordinary risks in the hope of a lucky fluke enabling them to score a success.

It would be impossible to leave the subject without paying a tribute to Mr. Rodman Wanamaker, who is finding the money for the projected flight. He is doing it from a purely public-spirited motive, that being, as he says, to develop aerial navigation, and incidentally, to celebrate the centenary of Anglo-American peace. It is to men such as Mr. Wanamaker that aviation is under a deep debt of gratitude for, had it not been for the generous way in which wealthy patrons of the science have come to its assistance, the stage of development to which it has arrived would in all probability not have been reached for years to come.

Risks that are Taken.

We have recently had sent to us for our inspection a sprocket which had been used for driving the magneto on a Gnome engine. Apparently the sprocket in question was one originally intended for the rear wheel drive of a bicycle, and had been adapted (!) to drive the magneto. The manner in which this had been done was interesting, though appallingly crude. As many of our readers will doubtless remember, the spindle of the Bosch magneto is tapered to take up the drive and, with a properly fitting sprocket, is most perfectly satisfactory. In the case under notice the taper was ignored altogether—the hole through the boss was over an inch in diameter and screwed inside. Across the face of the sprocket was rivetted a strip of thin iron, the two "rivets" used being ordinary French nails. In the centre of the strip a square hole was cut, to take an ordinary black iron carriage bolt with a square shoulder, screwed into the magneto spindle, which had been drilled and tapped for the purpose.

It may be that this was in the nature of a roadside makeshift and had been carried out to enable someone to get home for a permanent repair, though nothing is said as to this. The most that can be said is that, if it were in the nature of a temporary job, it reflects more credit upon the ingenuity of the one who carried it out than on his judgment. It needs scarcely pointing out that the aviator whose machine depended upon so crude an arrangement was taking an appalling risk in its use and we cannot too severely deprecate the use of such shifts, except under urgent emergency. There is no sense in increasing the risks of flying by the use of such devices as this—it is simply asking for a catastrophe. We sincerely trust that this is an isolated incident and that not many of our airmen are seeking trouble in the way the genius who perpetrated this "repair" went out to look for it.

W. RIDLEY PRENTICE.

ALTHOUGH coming little before the public notice, the subject of our portrait this week, Mr. W. Ridley Prentice, has for the past three years been very closely associated with aviation, and has had a varied experience. Becoming very interested in the subject of aerial navigation, he decided after nine years' navigation experience in the Merchant service, to turn his attention to practical flying. He joined the Grahame-White school at Hendon in January, 1911, and first learned to pilot a Henry Farman machine. A feature of his tuition was the race as to who should have the first *brevet* with Lewis Turner under the new figure eight regulations. As a matter of fact, Mr. Ridley Prentice finished second, his ticket being numbered 67. He then went on to the Blériot machine, but had only reached the "straight" stage when he took an interest in the Aeronautical Syndicate, Ltd., eventually becoming manager of the Co. In the following August and during the year he flew the different Valkyrie machines successfully. Unfortunately he terminated a flight on the racer one day with a steep dive from a height of 300 or 400 ft. with the Gnome engine running all-out. Mr. Ridley Prentice had a miraculous escape, being thrown clear, but sustaining concussion of the brain; the effects of this were felt for several months, and eventually led him, much to his disappointment, to retire from active flying. In 1912 he had some interesting technical experience when assisting Mr. H. Barber in his capacity as Aeronautical Adviser to Lloyd's, while in the autumn of that year the commercial field of the industry was again entered, Mr. Ridley Prentice joining the General Aviation Contractors, Ltd., of London and Milan, as director and general manager. In January of this year he further became managing director of both the British Anzani Engine Co., Ltd., and of the British Emaillite Co., Ltd., and was largely instrumental, in co-operation with Mr. D. Lawrence Santoni, in the formation of the "Savoia" Co., Milan, holding the Italian rights for the famous Henry and Maurice Farman machines.

THE HAWK.

Raynham Beats the British Height Record.

ON Tuesday, Mr. F. P. Raynham, accompanied by Mr. R. MacGeagh Hurst, succeeded in beating the British height record for pilot and passenger, of 12,900 ft., made by Mr. H. G. Hawker on the Sopwith biplane last June. Mr. Raynham, during a flight of one hour and twenty minutes, took the 80 h.p. Avro to a height which is given unofficially as 14,420 ft.

Beating the World's Duration Record.

SPLENDID as was Langer's duration record, to which reference was made in FLIGHT last week, it was completely put in the shade by the performance by Ingold on a Pfeil biplane on Saturday last. Setting out from Mulhausen at 7.35 a.m., he landed at 11.55 p.m. near Fuerstenried, so that he had been in the air for 16 hours 20 mins., during which he covered a distance of about 1,700 kiloms. Langer's record was 14 hours 7 mins. The Aviatik-Pfeil biplane used is fitted with a 6-cyl. Mercedes motor.

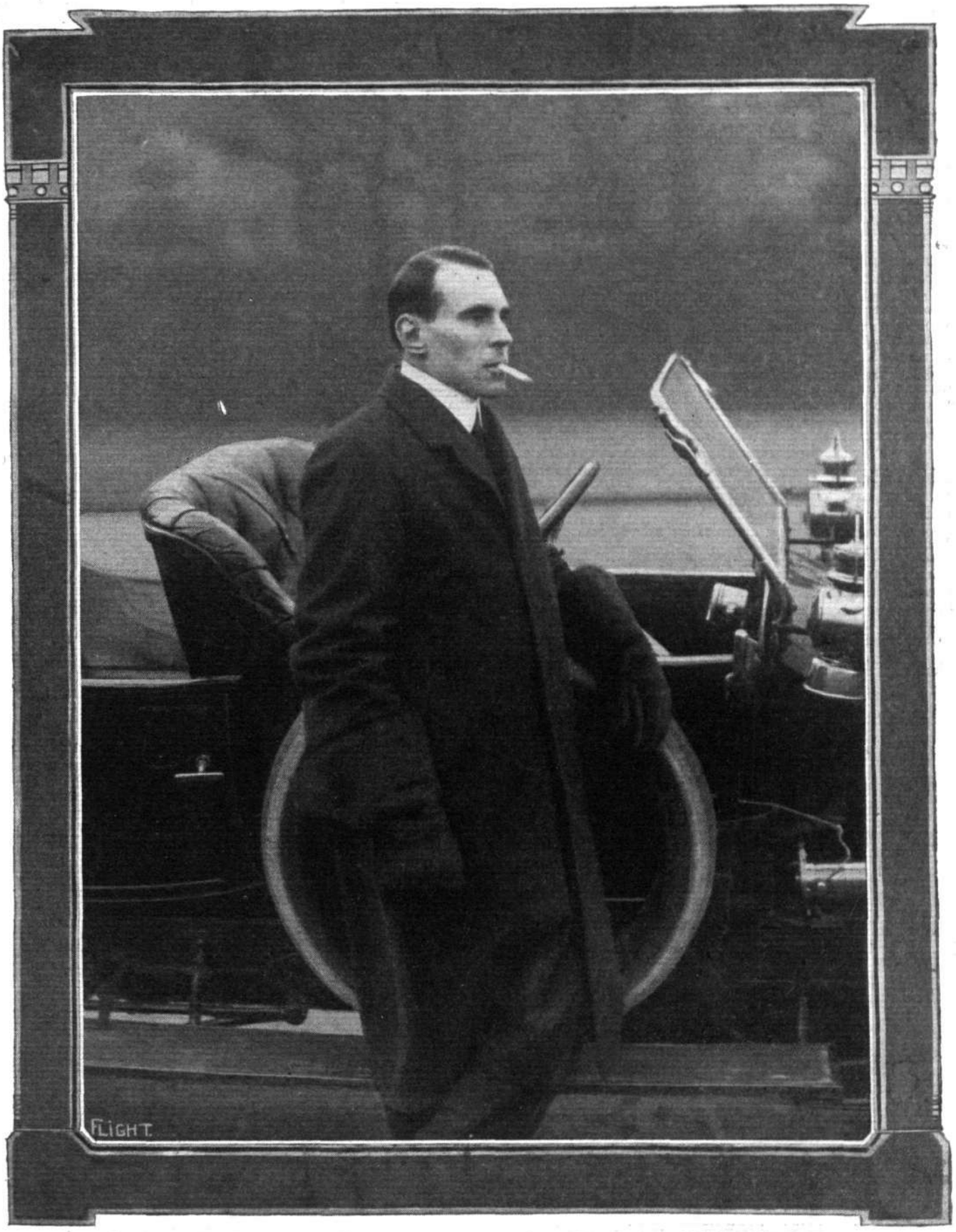
Legagneux's Height Record.

THE Commission Sportive Aeronautique has passed the height record made by Legagneux at Frejus on December 27th as 6,120 metres, so that it beats Perreyon's old record of 5,880 metres by 240 metres.

Records with Four and Five Passengers.

FOLLOWING up his excellent performance in taking six passengers to a height of 1,750 metres, as recorded in our last issue, Garaix on the Paul Schmitt biplane at Chartres, on the 4th inst., took five passengers up to 2,250 metres, while two days later he took four passengers up to 2,750 metres. These two records beat those of Sablatnig, which stood at 890 and 2,089 metres respectively.

MEN OF MOMENT IN THE WORLD OF FLIGHT.



MR. W. RIDLEY PRENTICE.

FLYING AT HENDON.

THURSDAY of last week was such an exceptionally fine day that it is hardly surprising such a large number of people turned up at the aerodrome and that they witnessed some very good flying. From 3 o'clock until dusk, nine Hendon pilots put up numerous exhibition and passenger flights, whilst at one time there were seven different machines in the air together. The flight of the afternoon was made by F. W. Goodden on the 45 h.p. Caudron. He executed some wonderful "stunts," which reminded us of Chanteloup. Philippe Marty, almost quite recovered from his accident the previous Saturday, was flying again on the 80 h.p. Morane-Saulnier, and took up several passengers, including a gentleman from Ceylon, who made his first trip in an aeroplane. The Grahame-White tractor one-and-a-half plane "Lizzie" made its reappearance, piloted by R. H. Carr; this remarkable little machine has been in hospital for some time, due to an accident when landing after a passenger flight. Other pilots who contributed to the flying were E. Baumann on the Caudron, G. M. Dyott on the Dyott monoplane, Marcus D. Manton and L. Strange on G.-W. biplanes, Louis Noel on the Maurice Farman and J. L. Hall on his Avro biplane.

There was a great change in the weather on Saturday, the wind blowing at about 35 or 40 m.p.h. A cross-country handicap had been arranged for the February meeting on this day, but once again the elements necessitated a change of programme, in fact only one flight was made. This was put up by Louis Noel, who pluckily kept up the reputation of Hendon by ascending with a passenger on the Maurice Farman.

At about 3.30 p.m. he taxied out to the far end of the aerodrome, turned head to wind, and literally leapt into the air. For nearly ten minutes he fought with the wind, being blown about in a manner that made one hold one's breath, especially when he drifted over the sheds out of the aerodrome. Eventually, however, he made an excellent landing, and the machine was returned to its shed. The wind increasing rather than diminishing, it was decided to make no further flights that day. Sunday was not quite so windy, but rain came in its place, and thus prevented any flights from being made at all.

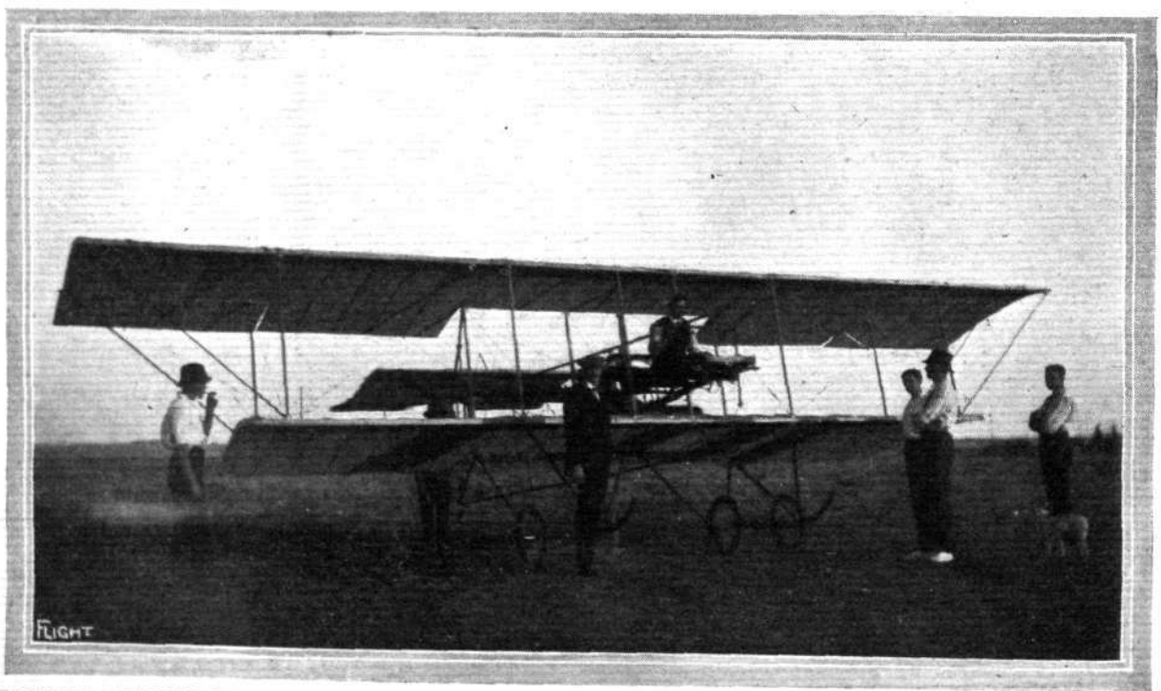
A record list of proposed events has been announced by the London Aerodrome management for the coming season, including several interesting meetings, as will be seen from the list which we give herewith. Several improvements are to be made to the aerodrome itself, so that everything seems to indicate an exceptionally successful season.

Mar. 19. Thursday. Desoutter Benefit Meeting.
Mar. 20. Friday. Hendon Aerodrome Dinner and Presentation of Trophies.
Mar. 21. Saturday. Aero Show Speed Contest.

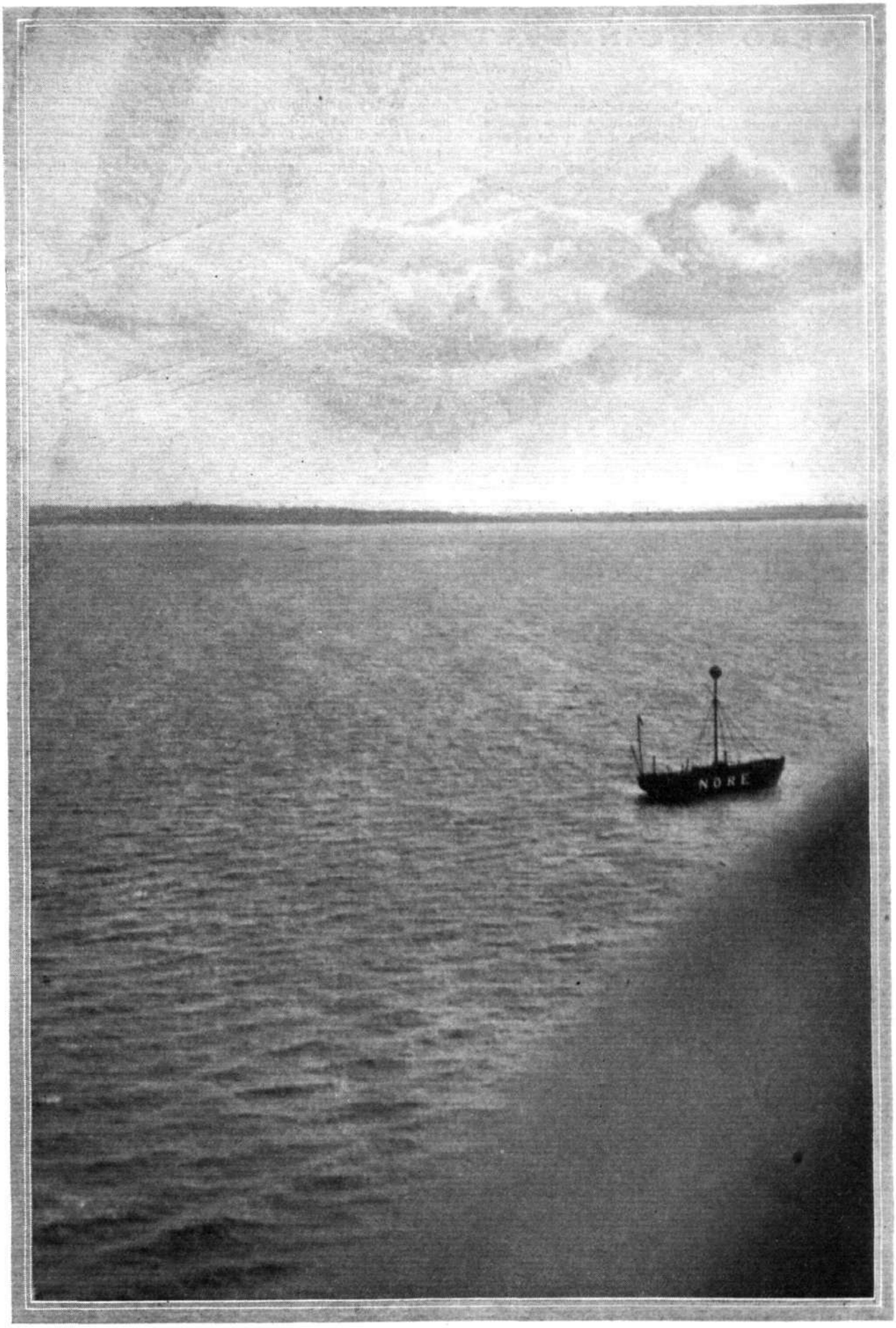
April 9.	Thursday.	Easter Holidays. Opening of the Hendon Summer Season. Seventh London Aviation Meeting (five days).
April 10.	Good Friday.	
April 11.	Saturday.	
April 12.	Sunday.	
April 13.	Bank Holiday.	
April 23.	Thursday.	(3 p.m.) Speed and Altitude Tests. (8 p.m.) Illuminated Night Flying and Firework Display.
May 9.	Saturday.	Suggested date for Hendon–Paris–Hendon Air Race.
May 23.	Saturday.	The Aerial Derby (for the *Daily Mail* Gold Cup).
May 30.	Saturday.	Whitsun Holidays. Eighth London Aviation Meeting (three days).
May 31.	Sunday.	
June 1.	Whit-Monday.	
June 11.	Thursday.	Aerial Fête and Battle of Flowers. (Anglo-American Centenary Celebrations.)
June 12.	Friday.	Preliminary Tests for the Anglo-American Trophy. (Anglo-American Centenary Celebrations.)
June 13.	Saturday.	Speed Contest for the Anglo-American Trophy. (Anglo-American Centenary Celebrations.)
June 14.	Sunday.	Anglo-American Sunday. (Anglo-American Centenary Celebrations.)
June 20.	Saturday.	Entente Cordiale Meeting.
July 4.	Saturday.	Ladies' Day.
July 18.	Saturday.	Hendon–Brighton–Hendon Air Race.
July 25.	Saturday.	Blériot Meeting (Fifth Anniversary of the First Cross-Channel Flight).
Aug. 1.	Saturday.	August Holidays. Ninth London Aviation Meeting (three days).
Aug. 2.	Sunday.	
Aug. 3.	Bank Holiday.	
Aug. 20.	Thursday.	Aerial Fête and Battle of Flowers.
Sept. 17.	Thursday.	(3 p.m.) Speed and Altitude Tests. (8 p.m.) Illuminated Night Flying and Firework Display.
Sept. 19.	Saturday.	Colonial Meeting.
Sept. 26.	Saturday.	Naval and Military Meeting.
Nov. 5.	Thursday.	(2.30 p.m.) Speed and Altitude Tests. (8 p.m.) Special Illuminated Night Flying and Firework Display.

Dates to be announced later:—

Oxford *v.* Cambridge.
Lancashire Meeting.
Territorial Meeting.
International Air Tournament (eight days).
All-British Meeting.
Demonstrations of "Looping the Loop" and Upside-down Flying.
Public Schools Meeting.
Children's Day.
London Day.



A SOUTH AFRICAN-BUILT BIPLANE.—In the pilot's seat is seen Mr. Compton Paterson, the designer and pilot, and standing on his right is Mr. H. Carpenter, the constructor.



"THE MAN AT THE NORE."—As seen from Squadron-Commander Seddon's Maurice Farman waterplane when flying over the mouth of the Thames last September. The photograph was taken by Mr. W. J. Casey.

AERO ENGINES AT PARIS SHOW, 1913.

(*Continued from page* 137).

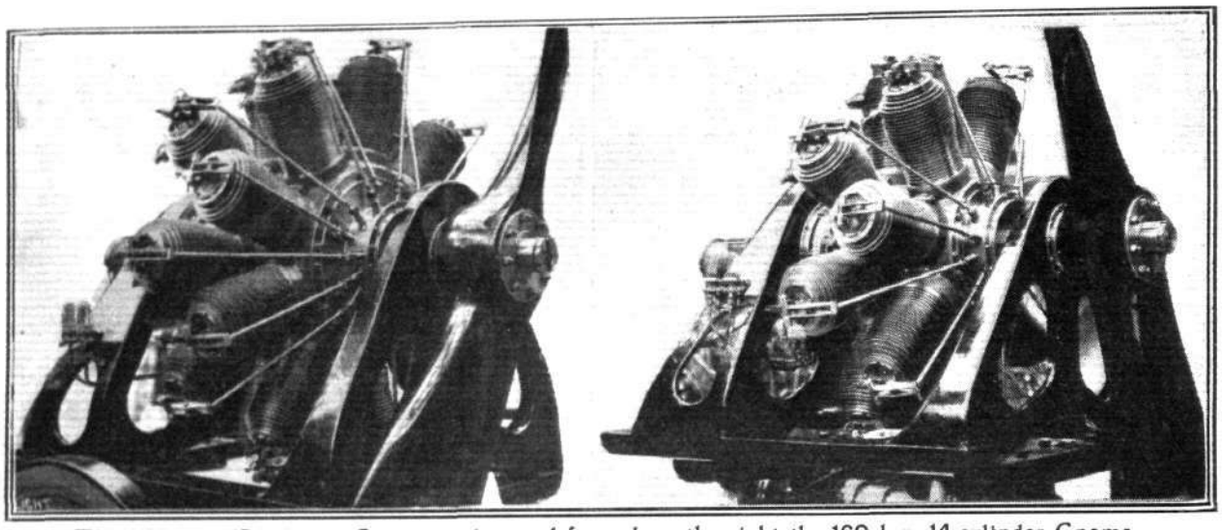
Gnome.

It is hardly necessary to make more than the briefest reference to the engines of the older types exhibited on this stand, since they are so familiar to all our readers as to render a detailed description superfluous.

The engines exhibited are given in the table, from which it will be observed that this firm have now three 100 h.p. models—the new 9-cylinder 124 mm. by 150 mm., the new "mono-soupape" 9-cylinder 100 mm., and the earlier 14-cylinder 110 mm. by 120 mm. The weights of the "mono-soupape" engines are not quoted, but it will be noted that the 9-cylinder has an advantage in weight of 11 lbs. only over the 14-cylinder engine. The first-mentioned engine made its first appearance on Borel and Deperdussin monoplanes at Monaco in April last, but did not take part in the competitions. The 200 h.p. engine, which was also introduced this year, is composed of two sets of nine cylinders, all the cylinders forming each group being co-planer, as on the 100 h.p. engine, but the valve gear has been transferred to one end of the engine.

The "mono-soupape" engines are distinguished from their predecessors by the suppression of the inlet valve, as such. The formation of the charge in the cylinder is effected by mixing a quantity of pure air admitted through the exhaust valve, which is caused to remain open after the period of exhaust and during a portion of the induction stroke, with a rich mixture passing through ports formed in the lower portion of the cylinder barrel communicating with the crank-case. The gas entering by the porting is but a small proportion of the total charge, the air serving merely as a vehicle for the petrol. It is claimed that the extremely rich mixture contained in the crank-case precludes any possibility of firing back, owing to its inflammability, and that the pure air entering *via* the exhaust-valve has a beneficial effect by reducing its temperature. A special control is fitted to these engines which allows of the variation of the lift of the exhaust-valve to be effected.

Another interesting exhibit on this stand was a group of engines, each of which represented a stage in the development of the Gnome engine from its commencement.

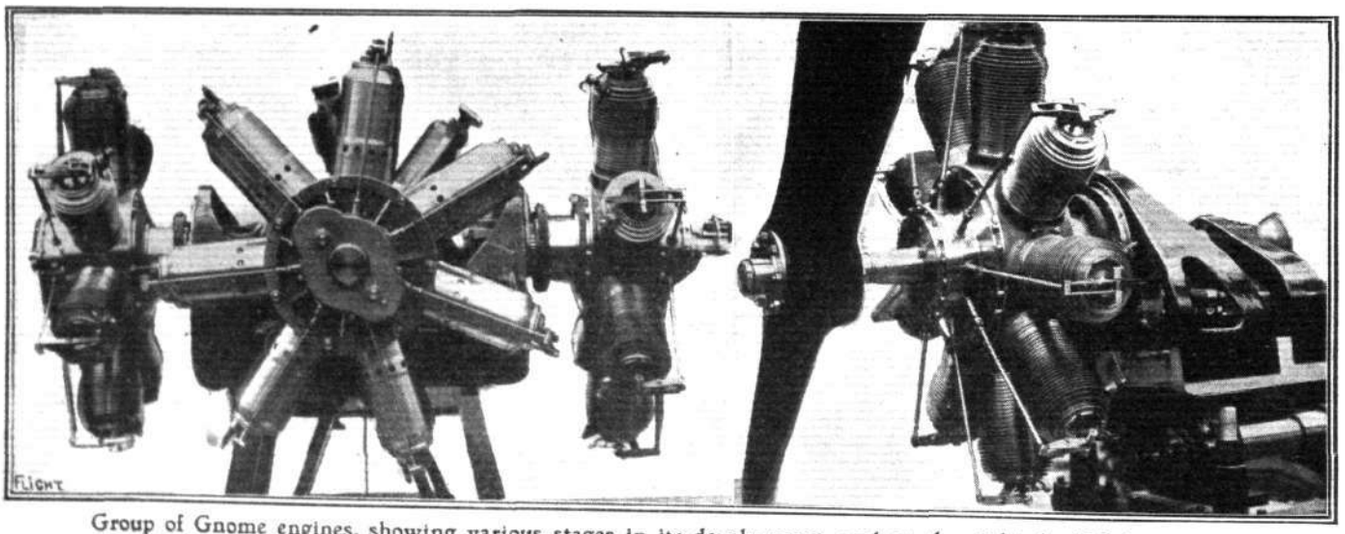


The 200 h.p. 18-cylinder Gnome engine on left, and on the right the 160 h.p. 14-cylinder Gnome.

Laviator.

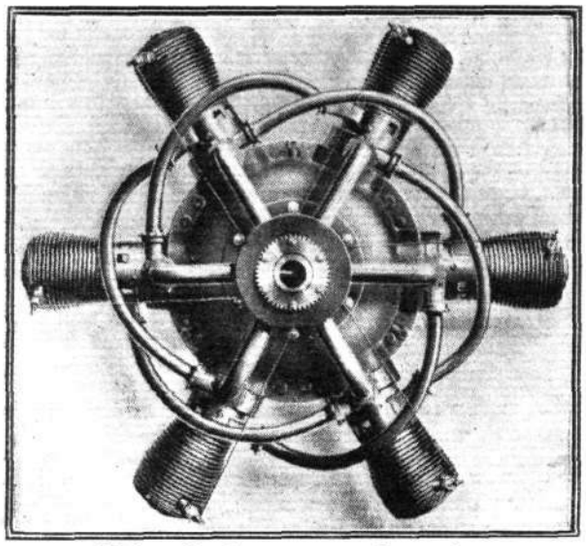
The four engines exhibited by this company included two engines working on the two-stroke cycle and the other two, Dansette Gillette engines, on the four-stroke cycle.

It will be noted from the table that the dimensions of the two two-stroke engines are the same, but a slightly higher speed (1,300 revs. per min.) is permitted on the water-cooled than in the air-cooled engine that runs at 1,200 revs. per min. The cylinders are equally spaced around the crank-case and have two bores, that which is most remote from the crank-shaft having the smaller diameter and constituting the working cylinder, while the innermost and larger diameter portion forms a pumping cylinder. The pumping cylinder of each set is connected by external piping to the working cylinder, which is 120 degrees in advance of it, in the direction of rotation, and by other pipes to the boss of the crank-case. Ports are formed through this boss, so that as the crank-shaft, which is hollow and in communication with the carburettor, rotates, the opening in the surface of the shaft registers successively with the conduits leading to the pumping cylinders. Hence, the charge is first drawn into the pumping cylinder and then completely discharged into the working



Group of Gnome engines, showing various stages in its development, and on the right the 100 h.p. engine.

cylinder, which it is intended shall receive it (namely, that which is 120 degrees in advance), when the crank is in a position relative to the latter cylinder of about 60 degrees past the outer dead centre. The introduction of this fresh charge scavenges out the inert products of combustion from a previous stroke, through exhaust ports formed at the base of the working cylinder. This engine is rated at 50 h.p. as a rotary engine and as a 65 h.p. engine when fixed.



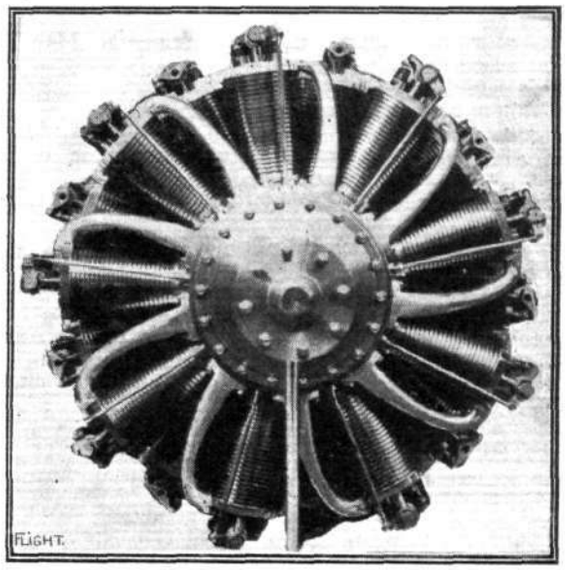
60 h.p. Laviator two-stroke engine.

In the water-cooled two-stroke model the engine is so placed that two opposing cylinders are horizontal, and the water enters the jacket of the left-hand lowermost cylinder at the head, passes out at the base of that jacket to the inner end of the water casing of the next cylinder, and so on round the various casings, until it is finally discharged from the head of the jacket of the right-hand lowermost cylinder. The jackets are held in position and leakage prevented by shrinking steel rings over the inner end.

The two four-stroke engines are of the 8-cylinder vee water-cooled type, and have mechanically operated valves. These valves, which are of a concentric design placed in the cylinder head and made of nickel steel, are actuated by levers and push rods from a single camshaft in the centre of the vee between the cylinders. The concentric type of valve has been tried many times by different manufacturers, but has usually been discarded. It is stated, however, that experience in the past with this model has given very satisfactory performances, and has led to its continuance on these engines. The cylinders are made separately of steel with a cast inlet and exhaust connection attached to the heads, which are not water cooled. Each group of four is supplied with gas from a separate carburettor, which may be either of the Zenith or the Claudel pattern. A single magneto is fitted, having an automatic advance and retard. The oil and water pumps, as well as the magneto and carburettor, are fitted at the end of the engine remote from the propeller.

Le Rhône.

These engines, which are of the air-cooled rotary type, are constructed entirely of steel, and, as usual in this type of engine, the explosive mixture is drawn through the crank-case, which runs upon ball-bearings fitted on the crank-shaft. In the 7, 9, and 11 cylinder engines there is one crank to which all connecting-rods are attached, and the cylinders are arranged in the same plane, but on the 14 and 18 cylinder motors two cranks are fitted, making 180° with each other, and the cylinders are in groups of 7 and 9 respectively for the two engines.



160 h.p. 18-cylinder Le Rhône engine.

Both valves are mechanically operated, one rod actuating the two valves in each cylinder through the rocking-lever, supported on ball-bearings, placed in the head. There are but two cams for operating the valves, each of which functions for the exhaust as well as the inlet, the order of firing in the 7-cyl. engines being 1, 3, 5, 7, 2, 4, 6. The exhaust valves are arranged on the leading side of the cylinder in the direction of rotation so as to receive the greatest cooling effect from the air, and the inlet piping, which communicates with the interior of the circular steel crank-case, is placed on the rear of the cylinders. It is claimed that by the use of this external inlet piping, troubles from a back fire to the crank-case are avoided. The cooling ribs on the flat head of the cylinder, which are made of steel, lie in the direction of rotation, and a cast-iron sleeve is forced into the interior of the cylinders when heated, to reduce the friction at the piston.

(To be concluded.)

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AIRSHIP NEWS.

Two Hour Trip by "Adjudant Vincenot."

ON the 5th inst. the "Adjudant Vincenot," piloted by Capt. Choix, and having nineteen passengers on board, made a cruise of over two hours' duration in the neighbourhood of Issy and Monthlery, &c.

Fine Trial by New Zeppelin.

THE latest Zeppelin—"Z 7"—built for the German army, successfully made her first long voyage on Saturday, from the Zeppelin works at Friedrichshaven to her new station at Potsdam. Commencing at 4.15 a.m., the trip occupied 8½ hours, the last 75 miles, by the aid of a following wind, being covered in an hour. The "Z5," which was stationed at Potsdam, has been transferred to Johannisthal for some time.

Long Cruise by Italian Dirigible.

ON the 5th inst., the Italian military airship "P4" made a trip of 7½ hours' duration, going from Campalto by way of Milan to Turin, where a landing was effected on the Mirafiori aerodrome. The distance covered was 475 kiloms., so the average speed worked out to 64 k.p.h.

The "Schutte-Lanz" on Trial Again.

THE new Schutte-Lanz airship built to replace the one wrecked last summer has commenced her trials. The new airship has a cubic capacity of 24,000 cubic metres, has three motors aggregating 550 h.p., and there are five cars.

The R.F.C. Parseval Re-appears.

THE Parseval airship, acquired by the British Government for the Navy, made a re appearance at Farnborough on Tuesday. Since her last appearance the airship has undergone reconstruction, and the envelope is now considerably larger than it was, while it has been covered with aluminium paint so as to render it less visible against the sky.

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AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

Election.—Mr. F. R. Harford has been elected a Member of the Society.

Meeting—The seventh meeting of the present session will be held on Wednesday, February 18th, at 8.30 p.m., when Major-General R. M. Ruck, C.B., R.E. (ret.) will preside. Mr. F. H. Bramwell, B.Sc., A.F.Ae.S., of the National Physical Laboratory, will read a paper, to be followed by a discussion, on "Propellers."

B. G. COOPER, Secretary.

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The British Army D.F.W. at Farnborough.

ON Tuesday the D.F.W. biplane ordered by the War Office was flown from Brooklands to Farnborough, where it will undergo its official tests before being taken over by the Military Wing of the Royal Flying Corps.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

ANNUAL DINNER.

THE ANNUAL DINNER will take place at the ROYAL AUTOMOBILE CLUB, PALL MALL, LONDON, S.W., (by kind permission) on FRIDAY, FEBRUARY 27th, 1914, at 7.30 for 8 o'clock.

In order to facilitate the arrangements, Members are requested to notify the Secretary as early as possible, if it is their intention to be present.

Members may be accompanied by Ladies.

Tickets (exclusive of Wines and Cigars) 12s. 6d. each.

The following presentations will be made during the Dinner :—

Britannia Challenge Trophy to Capt. C. A. H. Longcroft, R.F.C.

British Empire Michelin Trophy No. 1 and £500 to Mr. R. H. Carr.

The Marquess of Tullibardine, M.V.O., D.S.O., M.P., the Chairman of the Club, will preside, and The Rt. Hon. Winston S. Churchill, M.P., First Lord of the Admiralty, has honoured the Club by accepting its invitation.

There has so far been a great demand for Tickets, and the list will be definitely closed as soon as a sufficient number is reached. In order to save disappointment, members are therefore requested to make early application.

Special General Meeting.

Notice is hereby given that a Special General Meeting of the Club has been convened by direction of the Committee pursuant to Rule 30 of the Club Rules and will be held at 166, Piccadilly, London, W., on Tuesday, February 17th, 1914, at 5 p.m.

AGENDA.

1. To consider Rule 9 of the Club Rules, which reads as follows :—
   "Invalid Ballot Papers—No ballot paper which is signed or on which the number of candidates voted for is more than the number of vacancies or which is received by the Secretary later than 12 noon on the day preceding the Annual General Meeting shall be valid."

and if deemed desirable to alter such rule by adding the words "or less" between the words "is more" and the words "than the number" in such rule so that the same may read as follows :—

"Invalid Ballot Papers—No ballot paper which is signed or on which the number of Candidates voted for is more *or less* than the number of vacancies or which is received by the Secretary later than 12 noon on the day preceding the Annual General Meeting shall be valid."

2. New Club premises.
   To report result of circular to Members.
   To invest the Committee, if deemed desirable, with power to act in the event of an opportunity arising.

By order of the Committee,
HAROLD E. PERRIN, Secretary.

Annual General Meeting.

The Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held on Tuesday, March 24th, 1914, at 4 o'clock, at 166, Piccadilly, London, W.

Notices of motion for the Annual General Meeting must be received by the Secretary not less than twenty-one days before the meeting, and must be signed by at least five members. Wednesday, March 4th, 1914, is the last day for the receipt of notices of motion.

Committee.

In accordance with the rules, the Committee shall consist of eighteen members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The retiring members of the committee are :—

Col. J. E. Capper, C.B., R.E.	A. Mortimer Singer.
G. B. Cockburn.	T. O. M. Sopwith.
Major J. D. B. Fulton, C.B., R.F.A.	The Marquess of Tullibardine, M.V.O., D.S.O., M.P.
J. T. C. Moore-Brabazon.	Roger W. Wallace, K.C.
Com. C. R. Samson, R.N.	

Col. J. E. Capper, C.B., R.E., does not offer himself for re-election.

Any two members of the club can nominate a member to serve on the Committee, having previously obtained such member's consent. The name of such member so nominated, with the names of his proposer and seconder, must be sent to the Secretary in writing not less than fourteen days before the Annual General Meeting. Wednesday, March 11th, 1914, is the last day for the receipt of nominations.

Members are reminded that a ballot paper for the election of nine candidates to seats on the Committee of the Club will be forwarded to them at least seven days before the date of the Annual General Meeting.

The International Aero, Motor Boat, Marine and Stationary Engine Exhibition at Olympia.

The International Aero, Motor Boat, Marine and Stationary Engine Exhibition held by the Society of Motor Manufacturers and Traders, supported by the Royal Aero Club, will open on March 16th, 1914, and terminate on March 25th.

In connection with this Exhibition, a section for models will be organised by the Kite and Model Aeroplane Association, under the patronage of the Royal Aero Club. The Royal Aero Club will offer prizes amounting to £50 in this section. Full particulars can be obtained from the Secretary of the Royal Aero Club.

Members of the Royal Aero Club will be admitted free to the Exhibition on production of their membership cards.

International Races.

Gordon-Bennett Aviation Race.—Entries close on the 24th inst. The following entries have been received :—

A. V. Roe and Co., Manchester.
Sopwith Aviation Co., Kingston-on-Thames.
British and Colonial Aeroplane Co., Ltd., Bristol.

Jacques Schneider Maritime Race.—Entries close on the 24th inst. The following entry has been received :—

Sopwith Aviation Co., Kingston-on-Thames.

Airship Pilot Certificates.

(Fédération Aéronautique Internationale.)

The Sporting Authority governing aeronautics in each country represented on the F.A.I. can alone grant Airship Pilot Certificates to candidates, of at least 21 years of age, and coming under its jurisdiction.

1. To candidates of the same nationality as the club.
2. To foreigners belonging to a country not represented on F.A.I.
3. To foreigners of a country represented on the F.A.I. ; but in this case the certificate can only be delivered with the authorisation of the Sporting Authority of the candidate's country.

The Royal Aero Club of the United Kingdom will grant certificates in accordance with the regulations of the Fédération Aéronautique Internationale to candidates who have complied with the following rules :—

RULES.

1. A candidate, holding an Aeronaut Certificate, must make 20 ascents in an airship on different dates.

Aeronaut Certificates are issued when the following tests have been accomplished :—

(*a*) Five ordinary ascents in a free balloon.
(*b*) One solo ascent of at least one hour's duration.
(*c*) One night ascent of at least two hours' duration between sunset and sunrise.

2. A candidate, not holding an Aeronaut Certificate, must make 25 ascents in an airship on different dates.
3. On five of the airship ascents the candidate must pilot the airship during the whole of the flight, with a certified pilot on board, who must report on the candidate's proficiency.
4. During the five ascents, the airship must have :—
   (*a*) attained a height of 2,000 feet on at least one occasion.
   (*b*) accomplished a flight of at least two hours' duration on at least one occasion.
   (*c*) been taken out of its shed or other shelter and replaced after flight under the command of the candidate on at least one occasion.
5. The candidate must be able :—
   (*a*) To answer simple question on map reading.
   (*b*) To lay off a course on a map or chart, and give compass bearing with the necessary allowance for wind.
   (*c*) To explain principles of forecasting weather.
   (*d*) To explain rules regulating the navigation of aircraft.

6. The Royal Aero Club declines all responsibility for any accidents, or any damage that may occur to the pilots, their airship, or to any third parties during or in connection with the qualifying tests of the candidate.

7. Candidates must make application on a form provided for that purpose, and this form must be sent to the Royal Aero Club prior to the tests being made. Any expenses incurred must be borne by the candidates.

8. Foreigners belonging to a country represented on the Fédération Aéronautique Internationale can only receive a certificate from the Royal Aero Club with the consent of their national Sporting Authority. A certificate may be granted to a foreigner whose country is not represented on the Fédération Aéronautique Internationale.

9. The Committee of the Royal Aero Club will decide if the candidate has qualified for a certificate, but reserves the right to refuse the same or withdraw the same at any time without giving reasons.

10. The decision of the Committee of the Royal Aero Club in all matters connected with the tests is final and without appeal.

HAROLD E. PERRIN, Secretary.

166, Piccadilly, W.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

MONDAY, last week, Lieut. Briggs on Blériot 39, 80 h.p. Gnome. Com. Samson up on No. 3 at a great height. Later he was up on S. 10, 100 h.p. Gnome, making a long and high flight, and also a short trip on Dep. 7, 80 h.p. Gnome. Lieut. Peirse on Avro 16, 100 h.p. Gnome, for a long cross-country flight, with Lieut. Osmond, R.N., as observer. Lieut. Rainey numerous flights on H. Farman 31, 80 h.p. Gnome, he handling her in fine style. Lieut. Marix a long and high trip on Caudron 40, 80 h.p. Gnome. Lieut. Collett on S. 65. Capt. Kilburn on S. 65. Usual pilots making aerodrome flights. Telegraphist Stirling a high flight on Bristol 24, 50 h.p. Gnome.

Tuesday, Lieut. Briggs making some long flights on Blériot 39. Lieut. Marix piloting Sopwith 104 with Lieut. Davies as observer. Telegraphist Sparks piloting S. 63 for two or three circuits, Lieut. Rainey making a long flight on Bristol Tractor 43. Capt. Kilburn on S. 62. P.O. Andrews on Avro 41. Lieut. Rainey on Bristol Tractor 43 left with some oil for a pilot who had landed near Southend, but when nearing his destination he fell from about 50 ft., completely wrecking his machine, but escaping serious injury himself.

Wednesday morning the stranded pilot returned from Southend, after having had oil sent from the School. Lieut. Briggs made height-flight on the Blériot. Lieut. Marix piloted the Sopwith 104, with Lieut. Peirse as passenger on a long flight to Grain and Chatham. Com. Samson flying Dep. 7 at a great height. P.O. Andrews on Avro 41. Other pilots making aerodrome flights. Lieut. Lyttleton two good flights on Dep. 36, 80 h.p. Anzani.

On Thursday Com. Samson made two long flights on a new M. Farman, Lieut. Briggs flying well on a cross-country flight. He was forced down at Minster on a ploughed field owing to engine trouble, but did no damage to the machine. Lieut. Marix made some good flights on Caudron 40 and Sopwith 104. Lieut. Lyttleton also flying well on Dep. 36. Lieut. Collett on Avro 41. Lieut. Young on Avro 41, when coming down after a short flight, was hit in the face by something, his goggles being smashed. A search all over the machine revealed no loose or broken wires, and there was nothing to account for the mysterious blow. P.O. Andrews made a fine high flight on S. 63. Lieut. Davies some good flights on Sopwith 27. Lieut. Osmond on S. 63, and Capt. Kilburn on same. Other pilots making numerous flights lasting till quite dusk.

On Friday Lieut. Marix was making some fine flights in high wind on Sopwith 104. Asst.-Paymaster Finch Noyes on H. Farman 31. S. 63 was in use in the afternoon, piloted by different pilots. Lieut. Briggs returned from Minster, where he had been hung up for two days. Saturday was blowing an absolute gale. Lieut. Marix, accompanied by Capt. Kilburn, made a long flight, sometimes remaining stationary in the wind. Lieut. Briggs was up on Blériot 39. A Short biplane was standing on the grounds waiting for the pilot, when a sudden gust picked her up about 6 ft. high, when she looped the loop and landed on her back pretty badly broken up. Lieut. Lyttleton went up on S. 63 for a long flight across country, with Lieut. Ireland as observer, returning in the afternoon.

Civilian Flying.—Early Monday morning last week, Mr. Gordon Bell was up on the new Short Tractor 100 Gnome. After a short preliminary flight, he steered straight for the Isle of Grain, where he made a safe landing with a mechanic as passenger.

Brooklands Aerodrome.

Monday last week, the wind varied between 5 and 37 miles an hour. Pupils at the Vickers and Bristol Schools accomplished a lot of useful work. Mr. Dukinfield Jones was out on the Flanders biplane. Mr. Hamel left for Windsor with his mechanic on the Morane-Saulnier monoplane for the demonstration before His Majesty The King. Mr. Raynham made a number of flights on the 80 h.p. Avro biplane. In the afternoon, Mr. Hamel returned from Windsor. Mr. Raynham was again out on the 80 Avro, carrying one of the Vickers pupils (Mr. R. MacGeagh Hurst) as a passenger, remaining in the air for 65 minutes, an altitude of 11,500 ft. being reached. Mr. R. Kemp arrived on B.E. 249 biplane with Lieut. Adams of the Reserve as a passenger.

Rather less wind Tuesday, the variation being between 2 and 23 miles an hour. Mr. Dukinfield Jones was flying well for an hour on the Flanders biplane, climbing to nearly 4,000 ft. Mr. J. Alcock flew to Hendon with a passenger on the Maurice Farman (100 h.p. Sunbeam engine), a landing at Elstree having to be made on account of the misty conditions. The Vickers and Bristol Schools were in full swing. Mr. Barnwell took a passenger up on the Vickers radial biplane for an hour, reaching 3,000 ft. In the afternoon, Mr. Raynham with Mr. R. MacGeagh Hurst, made another fine flight, an altitude of 11,250 ft. being reached, the machine being in the air for an hour and a quarter, thirteen minutes of which was occupied in the downward glide. Mr. Alcock returned from Hendon with his passenger on the Maurice Farman biplane. Messrs. Barnwell and Knight were out on the Vickers radial biplane, and the Bristol School was at work.

Wednesday proved to be a record breaking day, the wind varying between 2 and 21 miles an hour. Mr. Dukinfield Jones made a number of flights on the Flanders biplane. Mr. Norman Spratt (with Mr. R. Kemp as a passenger) arrived from Farnborough on B.E. 2 biplane. Mr. Ronald Kemp flew back to Farnborough on B.E. 249. Mr. Raynham made an altitude test on the 80 Avro. In the afternoon Mr. Dukinfield Jones was again out on the Flanders biplane. Mr. Barnwell took the Vickers-Blériot monoplane up to 7,000 ft. The Bristol and Vickers Schools were fully engaged. But the work of the day was the magnificent flight by Mr. Raynham, who reached an altitude of no less than 15,000 ft. on the 80 h.p. Avro biplane (the previous best having been accomplished at Brooklands on the 31st May, 1913, by Mr. H. G. Hawker, who ascended to 11,450 ft. on an 80 h.p. Sopwith biplane), then shutting off his engine and gliding all the way to Hendon (21 miles) in 25 minutes, arriving there at an altitude of 5,000 ft., and making a fine spiral landing. This performance by Mr. Raynham is truly a testimony to the wonderful climbing and gliding capabilities of the standard Avro biplane, of which its manufacturers may well feel proud. Mr. Elsdon was out on the Vickers-Blériot monoplane. Mr. J. Alcock was further testing Mr. Coatalen's Sunbeam engine on the Maurice Farman biplane. Mr. Barnwell was flying the No. 5 Vickers monoplane.

Thursday was not quite so eventful a day, the wind varying between 2 and 23 miles an hour. In the morning the Vickers and Bristol Schools were at work, Mr. Dukinfield Jones being out on the Flanders biplane. In the afternoon Mr. Dukinfield Jones was again flying the Flanders biplane. The Vickers pupils were busy. Mr. Raynham was out on the 80 h.p. Avro, and Mr. Alcock on the Maurice Farman biplane.

On Friday there was less wind, the variation being between zero and 20 miles an hour. The Vickers School was at work. Mr. Alcock was out on the Maurice Farman biplane. At mid-day on Saturday the rain set in and lasted until the Sunday evening, no flying being possible.

Bristol School.—Halford first made a test, Monday, last week, taking Air-Mechanic Locker as passenger, after which this pupil made several splendid solo flights, but the increasing wind rendered tuition during the remainder of the day impossible.

Lieut. Binney, after making several straight flights and landings with Halford sitting in the passenger seat, on Tuesday, made his first solo, flying quite steadily and landing well. Air-Mechanic Locker then took over the machine, and made several solo straights and circuits. Both Lieut. Binney and Air-Mechanic Locker made further solos before the wind sprang up and terminated the morning's flying. In the afternoon Halford took up Lieuts. Lawrence, Ames and Binney in a bumpy wind.

Wednesday, after making a test, Halford sat behind Lieut. Binney on straights and landings, this pupil then putting in some good solo flying in a slight breeze. Lieut. Lawrence followed with Halford in the passenger's seat, after which he made his first solo, but the wind sprang up, and prevented further tuition being given

until late in the afternoon, when Halford took Lieut. Lawrence as passenger. This pupil then made several solos, as also did Air-Mechanic Locker. Halford took Lieut. Binney for straight flights, which finished the day's work.

Halford took Air-Mechanic Locker as passenger Thursday, and then sat behind this pupil on straights, also with Lieut. Binney, but the wind increased, and further tuition was impossible.

Friday and Saturday, no tuition was possible on either day owing to the gale.

Sunbeam Activity.—On Monday, Tuesday, Wednesday and Thursday of last week, at Brooklands, J. Alcock was flying the 100 h.p. Sunbeam-M. Farman, the work on the Tuesday including a trip to Hendon and back with a passenger. A cross-country trip with a passenger was also made on Thursday week.

Vickers School.—Monday, last week, Elsdon and Knight on biplane with Lieuts. Jackson and Prichard, and Crosbie. Barnwell with Mr. Spencer Warwick, Knight with Capt. Ross Hume.

Knight and Elsdon on biplanes, Tuesday, with Lieuts. Prichard, Crosbie and Jackson, and with Capt. Ross Hume and Mr. Spencer Warwick. Barnwell test No. 5 mono, Mr. Webb solo. Mr. Crosbie solo on biplane. Barnwell on biplane No. 26 with Vickers radial engine, for 1 hr. with passenger.

Wednesday, Barnwell, Knight and Elsdon on biplane with Lieuts. Crosbie and Prichard, and with Capt. Ross Hume. Knight with Mr. Spencer Warwick. Barnwell with Mr. Hurst. Barnwell on Blériot mono. to 7,000 ft. Barnwell on biplane with Lieut. Mansergh (new pupil). Messrs. Webb, Morgan, Hinshelwood and Chataway on No. 5 mono.

Thursday, Knight on biplane with Lieut. Mansergh, Capt. Ross Hume, and Mr. Spencer Warwick. Elsdon with same pupils.

Mr. H. A. Cooper, who has just passed for his *brevet* tests on a 35 h.p. Caudron at the W. H. Ewen School at Hendon.

Barnwell with Lieut. Jackson and Mr. Spencer Warwick. In afternoon Barnwell on biplane with passengers. Knight with Lieuts. Mansergh, Prichard, and Jackson. Barnwell with Lieut. Prichard, Capt. Ross Hume, and Mr. Chataway. Elsdon with Mr. Creagh and Lieut. Prichard, also with Capt. Ross Hume and Mr. Spencer Warwick. Knight with Mr. Farie (new pupil).

Eastbourne Aerodrome.

ON Saturday last Mr. Hamel gave an exhibition of looping the loop in a strong wind and rain, and intended doing so again on Sunday, but was prevented by the downpour of rain that continued throughout the day. On Monday the weather fined up, and in the morning Mr. Hamel took up three passengers, including one lady. He then went up solo and did some of his wonderful banks and loops. In the afternoon he was out passenger-carrying again, doing four glorious stunts. Gassler had the E.A.C. 'bus out, and was followed by Hunt. Fowler was also up, taking the lady pupil, Mrs. Salmon, for two or three circuits. Mrs. Salmon then took control, with Fowler in the passenger seat. Fowler then did a solo, and at about 1,000 ft. remained stationary above the 'drome for several minutes, pegging away against a 45 mile wind.

On Tuesday morning Mr. Hamel was out again, taking a passenger for a stunt over the sea, *vol planing* with his usual marvellous skill from about 4,000 ft. back into the Aerodome.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School. — Monday, last week, Messrs. J. Graham, Parker, Eldridge-Green straights, with Instructor Manton in passenger seat. Mr. Strange circuits.

Messrs. North, Barrs, Piercy, Grahame, Cowley, straights with Instructor Manton in passenger seat, Tuesday. Messrs. Bjorkland, Lillywhite, Howarth circuits, figures of eight, &c., afterwards Mr. Bjorkland going in for and gaining his pilot's certificate. Mr. Clarke solo straights.

Wednesday, Messrs. Lillywhite, Howarth, Clarke solo circuits, &c. Messrs. Parker, Moore straights, with Instructor Manton in passenger seat.

Friday, Messrs. Clarke, Parker, Moore, Piercy, Cowley, Barrs straights, with Instructor Manton in passenger seat. Messrs. Howarth, Clarke and Lillywhite solo circuits, &c.

Blériot School.—Two new pupils, Messrs. W. F. Cooper and H. O'Hagan joined the school last week, and on Tuesday, Friday and Saturday they were already doing straights and rolling alone, showing great progress. Mr. Gold made good straight flights.

W. H. Ewen School.—On Wednesday last week, at 4 p.m., M. Baumann made a flight on the *brevet* machine. Mr. F. Goodden test flight on 35 h.p. Caudron No. 1, after which Mr. Bankes-Price did straights and Mr. Curtis rolling practice.

During Thursday morning M. Baumann out on *brevet* machine, after which Mr. Murray did circuits, but the weather was not very good for pupils' practice. During the afternoon Mr. F. Goodden made a fine exhibition flight lasting 50 minutes.

At 9.30 a.m. on Friday, M. Baumann out on *brevet* machine. Mr. F. Goodden instructing Mr. Bankes-Price who was doing straights.

Hall School.—Monday last week, Messrs. D'Arcier, A. Brookes and Allen on Avro cross-country flights at altitudes varying from 1,599 to 3,000 ft., Mr. Hall in charge of controls. Kinematograph picture taken by B. and C. Kinematograph Co. Tuesday morning. In afternoon wind dropped sufficiently for H. G. C. Allen to do straight flights on his recently-acquired 35 Blériot; he made twelve good straights. A. Brookes on Avro as passenger; Messrs. Pinneger and Cini (mechanics) passenger-flights, attending to motor which was not giving usual good power. Wednesday, J. L. Hall took Messrs. Gering, A. F. D'Arcier and Brookes for passenger trips at varying high altitudes. Afterwards Mr. Hall, solo, mounting on Avro very high, executed a *vol plané* of five minutes' duration. In morning, Thursday, H. Gering four straight flights, and A.F. D'Arcier and A. Brookes two excellent straights on No. 2 Caudron before wind rose. Previous to their arrival J. L. Hall was giving instruction to H. G. C. Allen on Blériot, leaving the ground at about 3 ft., Allen showed himself an apt pupil, and should make a good steady flyer. Rest of week too windy for flying; adjustments made to all school machines.

Salisbury Plain.

Bristol School.—Monday, last week, the weather throughout the day was too windy and misty for tuition to be given to pupils.

Tuesday opened windy and misty, and it was not until late in the afternoon that it cleared up, when Jullerot went out for a test flight, and took Lieut. George and Lieut Barrett each for a tuition flight. Voigt also gave tuition to Mr. Stutt.

During Wednesday morning a thick fog prevented any tuition being given, but during the afternoon Jullerot tested the tractor biplane, taking Lieut. Harman as passenger. He then gave tuition to Lieuts. George and Barrett on the school biplane in a bumpy wind, and also to Mr. Stutt.

No tuition was possible Thursday morning owing to the thick mist, but in the afternoon Voigt gave two tuition flights each to Lieuts. Harman and Barrett, and one flight to Lieut. George.

Friday, the mist in the morning and high wind throughout the remainder of the day rendered tuition impossible.

Rain and wind all day Saturday again prevented any tuition being given.

Shoreham Aerodrome.

ON Monday and Tuesday of last week good practice was had by the pupils of the Shoreham Flying School, under the instruction of Mr. William H. Elliott. The pupils out doing straights and circuits alone were: Messrs. R. P. Cannon, Purnell, A. Maskall, P. H. Maskall, Hayland-Wilson, Aikman, Midshipman Thompson, R.N., and Lieut. Clemson, R.N.R.

After the pupils had had a whole day's practice on the 45 h.p. Avro biplane, Mr. Clemson, whilst doing a curve, failed to put the machine on the straight for landing, and switched off his engine a number of times while turning near the ground.

The result was that the machine struck the ground sideways, and will now be in the sheds for about two weeks for repairs, a very considerable amount of damage having been done.

FLIGHT

EDDIES.

WELL! the days are lengthening now; sometimes when I leave Hendon it is not yet dark. The grass is beginning to look more green, the mud is not quite so watery, and I shall soon be able to cross the footpath from the church without getting bogged. The cars of the aviation "somebodies" are becoming more numerous in front of the Blériot sheds, and the public are more in evidence in the enclosures. Those of us who have lately been taking such a great interest in the interior of the Press Club and the Pavilion can now get out our note-books and our cameras *en route* for No. 1 pylon, and try to appear as though we had been there all the time. The first real meeting of the year is very appropriately fixed for St. Valentine's Day, and things are on the move.

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By air across the Atlantic seems to be shaping into a reasonable, not to say probable, proposition. Lieut. Porte is practically certain to be one of the two pilots in the Glenn Curtiss flying-boat, the other being an American. Mr. Porte is a first-class pilot, and his nautical knowledge will stand him in good stead on the trip. The productions of the Curtiss firm are too well known to need any comment as to the quality, and all that seems needed is a little experimenting and favourable weather for the try. I wish we could have been sure of being more ready with an English machine so that England could have a chance of claiming the honour of having accomplished this history-making flight, but whoever is first seriously to try I hope will win whatever his nationality, in return for having made the effort.

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I should like to have been with Raynham on his glide from Brooklands to Hendon after making his British altitude record of 15,000 feet. Of all the glorious and exhilarating sensations to be enjoyed by flying, I should imagine nothing could beat this 20-mile glide through the air with all noise of engine absent. This seems to me to be flying exactly as we should like it to be. Fancy gliding along through the air without a sound except the singing of the wind through the wires: gliding along over the country with a machine in perfect control, able to turn about where one pleases, with only a loss of altitude as the expense. Could it but go on indefinitely it would be perfect. The view, too, from such a height must be magnificent. I rather envy Harold Blackburn having had that trip.

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Mr. Charles Niles, a young American, must surely have written *finis* to most things that can be accomplished on an aeroplane in the "thrill" direction. He is said to have started out to loop the loop in the ordinary manner, but his gyrations were far from ordinary. At an altitude of 3,000 feet he turned the nose of his machine up to form the circle, but his engine stopped through lack of fuel supply, and the machine slid down tail first for some 1,000 feet. Then it turned over, and dropped a like distance nose first. From this position Niles rescued it only to fall over sideways. Then when only 200 ft. from earth, and flying upside-down, he managed to start his engine again and flew away, still the wrong way up. "He sailed away into the east, where he climbed upwards till he brought his machine into the normal position." I have never seen a pilot get his machine from the upside-down to the normal position by climbing upward, and until I do, or have direct evidence by experienced watchers to the effect that it has been done, I shall continue to think that it is not possible.

It is gratifying to hear that Mrs. Stocks is slowly regaining her health, and we shall all look forward to seeing her once again during the season at Hendon. Miss Trehawke Davies is unfortunately making but slow progress towards recovery from her illness, and has gone away to a nursing home. Both have been ill for a long time, and now there is a chance of better weather prevailing, may they quickly regain their health.

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Next week will see Mr. G. W. Beatty opening his flying school at Hendon, equipped with a fine fleet of machines, represented by three Wright biplanes and a Handley Page monoplane, and Mr. Beatty will also have charge of the Handley Page school pupils. Mr. Beatty's idea of teaching is to take the pupil for flights right from the first, and so they will get their first experience on the Wright machines which have dual control, whereby the pupil, sitting beside the pilot and holding the levers, gets actual flying experience and learns by practice to do what the pilot does by instinct. When the pupils have advanced sufficiently they will be given control of the monoplane, and this machine will be used in obtaining the *brevets*. Pupils will be taken up for fifteen minute periods, and Mr. Beatty contends that this is the best and quickest method of teaching, and taking into consideration his splendid record of pupils passed in America, seems to prove so. Mr. Handley Page and his assistants, with the benefit of his large works and experience in building, will be able to keep the machines always in good condition, and Mr. E. Baumann, chief pilot-instructor at the Ewen school, is joining up with them as chief assistant instructor. Altogether, the school makes a start under excellent auspices.

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Congratulations to Nieuport (England) Ltd., including Mr. A. Picard, the managing director, and Mr. Max Worms, the secretary, on the forming of their company. Everything is now getting into running order, and from February 16th the premises of the company will be at 45, Great Marlborough Street, W. Congratulations also that they have obtained the services of such a fine flyer as Mr. G. M. Dyott, the well-known pilot-constructor, and to Mr. Dyott for having the good fortune to become connected with such a firm. Mr. Dyott is now in Paris practising on the various types of Nieuport machines at Issy, and will most probably fly one over when ready.

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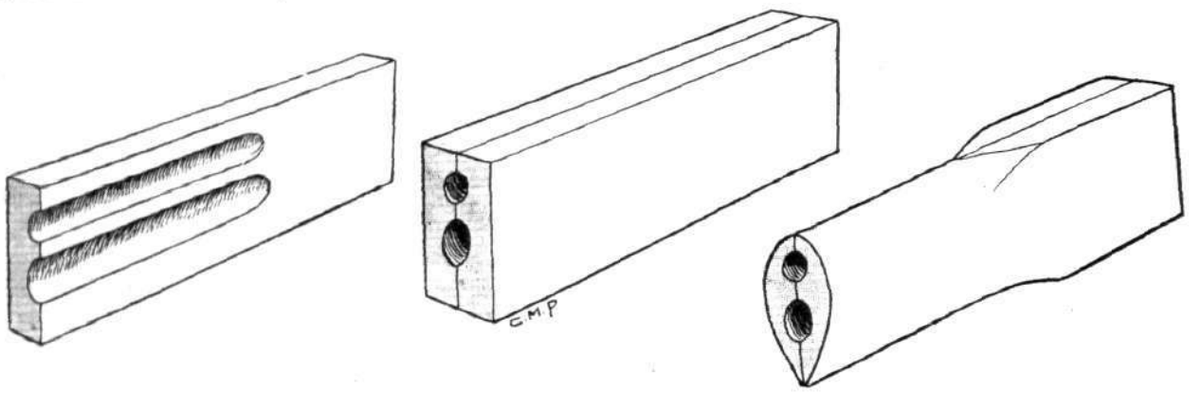
I am sure that one and all, especially those who knew Robert Slack personally, will come forward and help the fund which has been started for the benefit of the widow and the two young children, a girl of seven and a boy of four. The Committee which has the matter in hand comprises Messrs. O. F. Odell, R. P. Baker, A. C. Hunter, John Ames and A. W. M. Ramsay and Mr. F. N. Birkett is acting as Hon. Secretary. Any donations, however small, will be welcomed and acknowledged in FLIGHT and the aeronautical Press, &c. Among the subscriptions already received are: International Correspondence Schools, 20 guineas; General Aviation Contractors, 5 guineas; Mr. J. Withers, £5; Mr. O. F. Odell, 2 guineas; Mr. J. Cates, 2 guineas; Messrs. Chas. Lane, B. C. Hucks, J. Teulade, C. G. Grey, J. C. Dunne, J. H. Ledeboer, Stanley Spooner, 1 guinea each; Mr. Halahan, £1; Mr. Ellis, 10*s.* 6*d.*; Mr. J. Nardini, 10*s.*; Mr. P. R. Ritchie, 5*s.*; Mr. J. H. Bliss, 5*s.* Cheques and Postal Orders should be sent to the Hon. Treasurer, Mr. A. Graham Mattey, Capital and Counties Bank, Kingsway, W.C., crossed "Slack Fund." "WILL O' THE WISP."

AN AEROPLANE IN THE MAKING.

(*Concluded from page* 149.)

BEFORE turning attention to the manufacture of the metal parts incorporated in the construction of an aeroplane, a few words should be said regarding the procedure followed in building up the inter-plane struts. On the majority of aeroplanes these are hollowed out for the sake of lightness, and whilst the sections vary with the different constructors—some favouring one particular section and some another—the method of hollowing them out is practically the same for all of them. First the wood—generally spruce—is sawn and planed down to a rectangular section slightly wider than the desired width of the finished strut, and having a thickness slightly in excess of half the length of the minor axis of the streamline strut section. These strips of wood are then passed through the spindle machine, where they are hollowed out either so that only a thin shell is left or, preferably, having a transverse web, as shown in one of the accompanying drawings, in order to better resist bending strains. It is, of course, desirable that the webs should run parallel to the minor axis of the elliptical section of the strut, as the tendency is for the strut to buckle transversely.



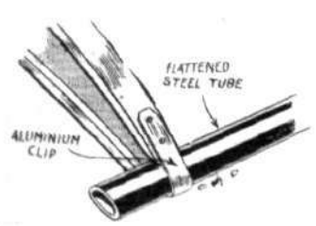
Three stages in the evolution of an inter-plane strut.

When the two halves of the strut have been thus hollowed out, the faces of them are coated with glue, and they are placed in a press consisting of a framework and numerous wedges, in which they are left to dry under a pressure of somewhere about 10 tons. When the glue has set and thoroughly dried, the struts are taken out of the press and sent back to the spindle machine, in which they are machined down to the desired streamline form; and when the two ends have been trimmed down to fit their respective sockets, and they have been varnished, the struts are ready to be put into place between the planes.

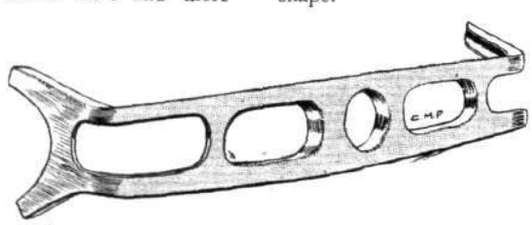
Interesting as the manufacture of the wooden component parts of an aeroplane undoubtedly is, the metal work department is, perhaps, even more so; and although wood forms the greater part of the material employed in the construction of the majority of present-day machines, it is more than probable that in the future steel, or, at any rate metal of some description, will be more extensively used as machines and their component parts become more and more standardised. At the recent Paris Aero Salon it was observed that the general trend of design was towards steel construction, and every year sees one or more aeroplane constructors discard wood in preference to steel for most of the parts of their machines, even if they do not build them of steel throughout.

There was a time when aluminium was extensively used for sockets, joints, &c., but lately steel seems to have superseded aluminium for that purpose, most manufacturers contending that weight for weight greater strength is obtainable by the use of steel. Generally speaking, the use of aluminium is confined in most modern machines to engine cowls, wind screens and other parts which do not have to stand any severe strains. The method of forming joints, &c., by means of steel varies considerably, but in modern times welding is extensively employed for the purpose, and when done by the simple oxy-acetylene process, this method seems to give every satisfaction. It may be explained that the oxygen and the acetylene gases are contained in two steel cylinders, and from each cylinder a flexible tube runs to a nozzle in which the two gases are mixed, the proportions being regulated by means of a small adjustable needle-valve. The mixture burns with an intensely hot flame, which is made to impinge upon the metal parts that are to be welded together so that they commence to melt, and this causes them to fuse or amalgamate. Great care must be exercised in doing this, for if the heat is too great the steel begins to run; and if the flame is not sufficiently hot a proper joint cannot be made, as the two parts do not then fuse.

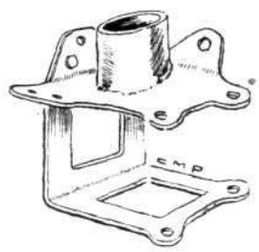
Sheet steel is frequently used for making clips, sockets, &c., and in many cases a socket is made out of a single piece of sheet steel, as illustrated by the sketches. The procedure followed in the manufacture of a socket of this description is as follows: a blueprint of the clip is sent to the works and the workman pastes or glues the blueprint on to a sheet steel plate and then cuts out the various templates from which the clips are made. The lightening holes, if any, are then cut out and the edges filed up to the outline on the blueprint. This template is used afterwards for all subsequent clips of this particular form, and from it are traced on to another piece of sheet steel as many of the clips as are wanted. When the outline of the clips have been traced on to a piece of sheet steel it is sent to the man in charge of the punching machine, who cuts away all the superfluous metal up to the tracing lines. Each blow of the puncher makes a small circular hole in the steel and as the holes overlap slightly, and as it is possible to judge very accurately the distance of the holes from the tracing lines, only about $\frac{1}{64}$ of an inch is left outside the line. This is afterwards filed off, and the clip is ready to be bent to shape.



The steel tube trailing edge.



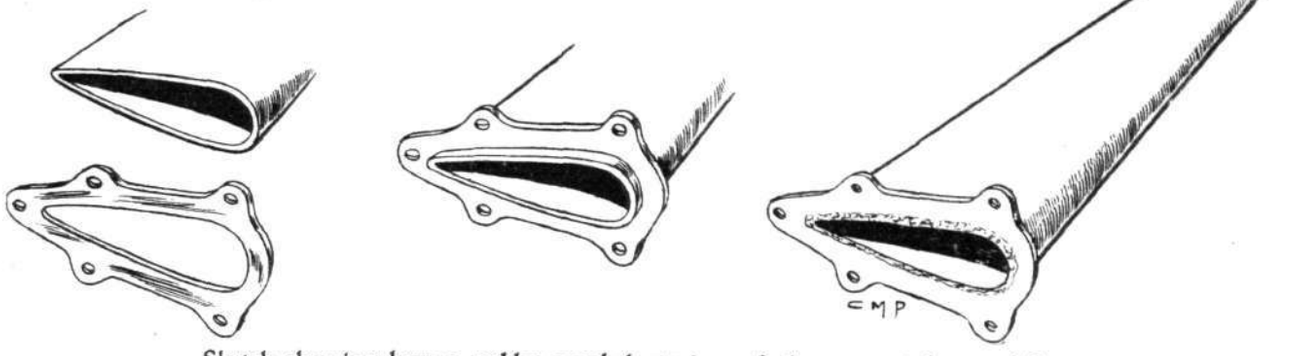
An engine frame hammered out of a single sheet of steel.



A strut socket made of three pieces. The socket is welded on to the upper plate and the two plates riveted together.

A variety of clips and sockets are made in this way, and the sketches show some of the more common forms. It will be noticed that in some cases a socket is provided on the side of the flat steel clip to which it is joined by welding. Another illustration shows how the rudder crank-levers are made. A piece of sheet steel of triangular shape is bent to form a streamline shell, rather blunt in front, and with a knife-edge at the rear, where the two edges of the steel are welded together. A small flange plate is then welded to the lower end of the crank-lever for the purpose of forming a means of attachment to the rudder. This plate, as the sketch shows, is slipped over the end of the crank-lever until about one-eighth of an inch of the latter protrudes outside the flange plate.

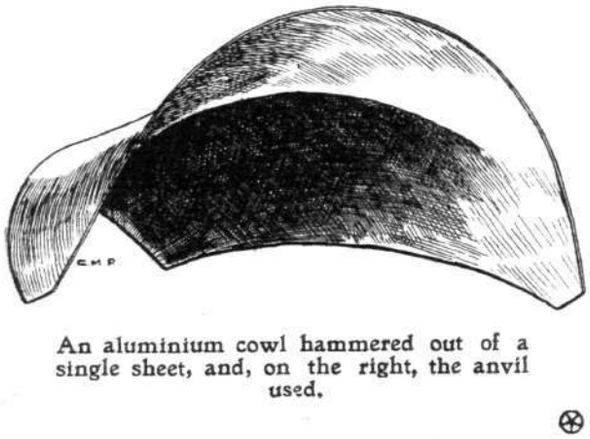
The two pieces of steel are welded together by letting the flame impinge upon them. The metal of the crank-lever soon begins to get hot, and when sufficiently heated runs down until it fills the small space between the crank-lever and the flange-plate. Should a small hole be left between the two, a piece of special Swedish steel wire, which the operator keeps handy for this emergency, is placed in the opening, and in melting fills up the hole, thus making a solid joint all along the edges of the flange-plate. This operation, as we have already said, requires great care, and skilled men must be employed for it. In order to protect his eyes against the glaring light of the gas flame, the welder wears special smoked glasses, which enable him to follow closely the process of fusing or welding the two pieces of metal.



Sketch showing how a rudder crank lever is made by oxy-acetylene welding.

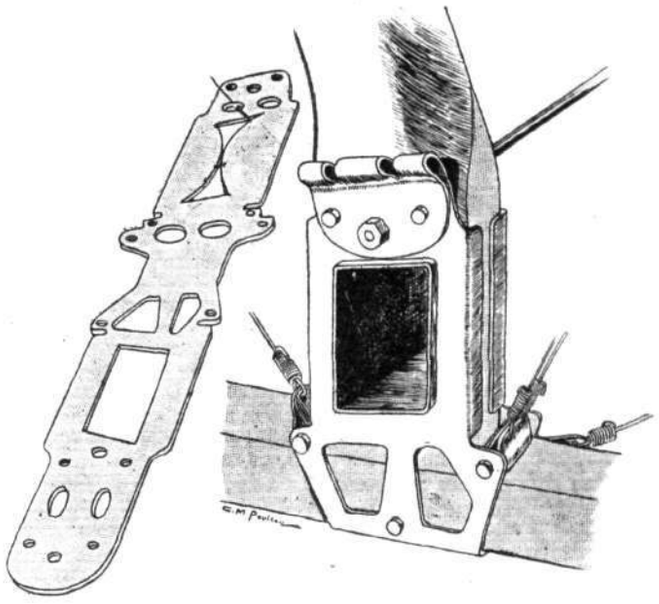
The subject of another sketch is an aluminium wind-shield which has been beaten out of a single sheet of aluminium. This is done by placing the sheet on a small anvil, similar to the one shown in the sketch, and hammering it with a wooden mallet until the desired shape has been obtained. In going over it the first time, only a slight curvature is obtained, and this is increased by degrees until sufficient curvature has been reached. The sketch illustrates one form of wind shield, but, of course, any desired shape can be obtained, and the process is used in making wind-shields, engine-cowls, &c. The procedure followed is the same in each case. The flanged steel engine-plate shown in one of the sketches is hammered out of a single piece of sheet steel, the flanges not being, as might well have been supposed, welded on.

Having arrived at this stage of the construction of the aeroplane, all that remains to be described is the erecting or assembling of the machine. The *fuselage* and wings are placed on trestles in approximately the right positions, and are then propped up until they are in line. The bolts and cables by means of which the wings are attached to the *fuselage* are then put into place, as are also the diagonal cross-bracing cables between the wings. As each wire has incorporated in it a turnbuckle or wire-strainer, it can be so adjusted as to give just the right angle of incidence. The *fuselage* is so placed that the propeller-shaft is absolutely horizontal, and this line is used as a guide for adjusting all other parts. Where a varying angle of incidence is employed the angle at any particular point is ascertained by means of a special instrument, which, on being placed on a straight-edge resting on the leading and trailing edges of the wing, shows the angle of incidence at that particular point.



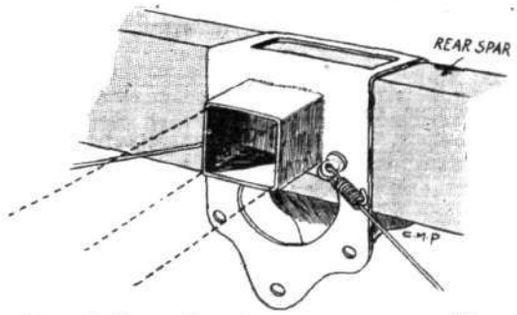
An aluminium cowl hammered out of a single sheet, and, on the right, the anvil used.

When the engine has been put into place and the whole machine adjusted, the wings are usually taken off, and the machine sent to be tried at the nearest flying ground, if the firm is not fortunate enough to have their works on the flying ground.



A socket connecting a *longeron*, a plane strut and the front spar; and on the left the sheet-steel clip from which it is bent to shape.

A few trial flights will generally suggest a few alterations to various parts, especially if the machine is the first of a new type ; and after these have been effected, the machine is tried again and again until it flies to the satisfaction of its designer. In the case of the Sopwith machines, we believe that most of them have flown well the first time out, a fact which speaks well for the design.



A steel clip and socket on rear spar. The socket is welded to the clip.

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Mr. Hucks at Birmingham Again.

TO-DAY, Saturday, Mr. B. C. Hucks is paying a return visit to Birmingham, and, commencing at 3 p.m., will give demonstrations of looping the loop and upside-down flying at the Tally Ho Club grounds.

Index and Title Page for Vol. V.

THE Index and Title Page for Vol. V, January to December, 1913, has now been printed, and can be obtained by sending 3*d.* to the publishers, 44, St. Martin's Lane, W.C. After February 21st the price will be 6*d.* post free.

FURTHER DEVELOPMENTS OF MILITARY AVIATION.*

By Lieut.-Colonel F. H. SYKES.

LAST year the Aeronautical Society kindly asked me to give my views on military aviation. I then tried to show the objects for which military aircraft would be used, the results likely to be gained, and the general lines upon which it was expected that progress would take place—in a word, the military aspect of aviation. I propose to-night to deal with the subject in the light of a year's progress. I make no excuse for reiterating the strong links which I feel bind soldier, sailor, designer, and aircraft constructor in this matter. Rapidity of progress is essential, and it can only be gained by cohesion of effort, lack of friction, and mutual understanding. The Service must remember that the aeroplane designer has to live, and is not always merely chasing "X" with a slide rule: the constructor that the soldier is not only pipe-clay and red tape, and that there is sometimes method in his madness.

The object of military aviation is the unselfish service of the State. It is essential that agreement should be promoted as to general lines of work needed and advisable, progress as to types of aircraft possible, and how they are to be built and used.

In this connection we must remember that in the Services "the best is often the enemy of the good." We cannot only look for what we want in the future. We must have a very tangible something ready for war in the present.

The progress made during 1913 tends to corroborate the ideas put forward in last year's lecture. Progress in aviation has not affected the principles of war strategy, nor will it, in my opinion, do so in the future, but strategic plans will require to be even more carefully worked out in peace than hitherto. An all-round acceleration will take place and less confusion occur. The cards will be more openly displayed.

The past year has been one of great interest. Safety, speed, strength, weight-carrying powers, climbing, and all-round efficiency have progressed. Some probabilities have been increased; some difficulties emphasized.

The results achieved by the new instrument of war are nevertheless of ever-growing significance and a short survey of the more importants points may be instructive.

I propose first to deal with the improvements arrived at, and indicate the more pressing requirements, secondly to turn to matters more directly appertaining to observation, and then to consider landing places and ground organisation, intercommunication and delivery of information.

Wind flying and duration.—The first improvement is undoubtedly that of general airworthiness. Last year I said that the use of aeroplanes was limited by fog, darkness and high winds. One of these limitations—wind—is already fast disappearing. A most marked advance has been made in long day-in day-out flying, almost irrespective of weather. I remember my delight on the evening of my lecture to this Society last year on receiving a telegram to the effect that the five aeroplanes, which then went to form the nucleus of our second squadron, had all safely reached their new station at Montrose. The flight from Farnborough is a fine one to-day, but a year ago it was a splendid flight, more especially as the weather conditions were bad. It took about a fortnight. Lately several of our aeroplanes have affected the same journey, under almost equally adverse wind conditions, in two days, and it has twice been done in good weather, in one day (once without a stop of any sort).

There are other indications of progress in this respect; for instance, before and after the Irish manœuvres our aircraft had to move some four hundred miles out to the manœuvre area and the same back (including two crossings of the Irish Sea), in addition to the actual work carried out while there on manœuvres. This was done without serious hitch.

Factors of Safety.—I am not quite certain that sufficient attention has been paid by designers to the fact that flying in high winds has been very much on the increase during the year, and that factors of safety have therefore decreased. This is the more so in view of the fact that such strides are being made in the direction of variable speed.

Climbing and Lifting.—Another marked improvement is in the climbing ability of the average aeroplane. A Service machine *must* be able to lift and climb well with a full load in windy weather, and four hundred feet a minute is now quite an ordinary achievement.

The notable advance made in variable speed, as exemplified, for instance, in the latest Sopwith, have helped greatly in the matter of landing in restricted areas.

Wing-Warping.—One cannot consider airworthiness without touching on the question of wing-warping as opposed to flaps. There is no doubt that the continual flicking about during a long flight of the control lever, caused by the self-warping of wings in a wind, has a very tiring effect on the pilot, and further, the warping wing requires more keeping in truth than one fitted with flaps. The dismantling and general handling of wings fitted with flaps is, besides, easier, quicker, and less liable to mistake. There is, I think rightly, a growing tendency to substitute flaps for warping.

Improvements in Landing Gear.—Bad landings must be expected from aeroplanes which are often called upon to bring back information to, and land in, a small field, probably surrounded by trees. Landing gears have considerably improved, but they still cannot withstand really rough treatment.

Such have been some of the advances as regards material and design. Progress in these and in other matters is still required. A little too much trust in Providence is still asked for. Military aviation, both in peace and in war, requires the utmost possible simplicity and strength. Much more ease is necessary in the removal and return of all parts. If an aeroplane is flying, morning and evening, it has at present still to be gone over more carefully during the day by its mechanics than should be necessary; and every fourth day it has to be left in for thorough overhaul and trueing up.

To and from, and during the actual days of manœuvres of last year, our aeroplanes flew an average of approximately 800 miles, but the number of hours flying per day that can be expected from pilots is going up slowly and steadily. This is due to the better training of personnel, to increasing reliability of machines, to improved arrangements for transport and spare parts—in a word, to better all-round training and organization. Last year I said that pilots and observers could only be employed for about three hours during the day. Now, in good weather for a short period, five hours flying a day can be done by good and seasoned officers.

The Motor.—Broadly speaking, the question of duration is now largely bound up with that of obtaining—(*a*) a good motor, including high fuel efficiency; (*b*) one capable of carrying the increased weight of fuel.

Engines are improving, but not very rapidly, though cases of failure are undoubtedly becoming more rare. A really reliable good engine of sufficient power is much wanted. This remark applies equally to British and foreign makes. I would add that a very intricate engine, whatever "Star" performances it may carry out under the eye of its maker and his pet mechanic, is not much use for the everyday purposes for which we want it.

Two engines may perhaps be the solution of many difficulties, but each still requires to be of a more reliable standard than is at present the case. I think that an opportunity is given by the forthcoming Competition.

Great progress has been made in the ability to keep the air in all weather for prolonged periods and to land in and rise from small areas, but I agree with the general view that there is still room for much improvement in the simplicity, strength and reliability of both aeroplanes and their engines.

Notes on Observation.

As a result of work done during manœuvres, it would seem that, given sufficient aircraft, failure to locate the enemy's movements may be due to two causes:—first, failure to carry out the reconnaissance owing to bad weather, engine trouble, failing light, &c., and second, failure owing to bad training or lack of skill in observation; to measures taken by the enemy to conceal himself, or again, weather.

None can control the weather, and engine failure is not altogether preventable. Knowledge, experience, training, the very careful selection of observers, and plenty of practice for them, are amongst the obvious remedies.

The instructions issued in September, 1910, for the manœuvres of that year, state "it is possible that our aeronauts may not readily find their way across country, and it must be borne in mind that they have had no practice in observing military operations from above."

It is quite possible that some aeronauts (even in this room there may be some) do not always readily find their way. But, as a matter of fact, there is no abstruse question of navigation about it, as one so often hears, it is mainly one of eye for country, aptitude for reconnaissance, and practice (for which, by the bye, many machines, preferably of the propeller type, are necessary).

A sound military knowledge is also essential. It is so pleasant in peace to go up for a "joy ride"; but go up as an observer in war, your brain slow and tired after many days and nights of strain, well knowing the fallibility of your machine, that your flyer is weary, that your machine and engine are tired. Know that much, very much, depends on you, your vision, decision, accuracy, and certainty. You see something. Your flyer throttles down to the lowest safe flying speed. Unless your faculties are well trained, you have passed it and have not decided what it is.

* Extracts from a paper read before the Aeronautical Society on February 4th 1914, at the Royal United Service Institution.

Training of Observers.—Long training and much practice for observers is essential. And, as I have said, good observation can only be carried out satisfactorily, on the basis of a large and sound knowledge of military matters.

In working in the area traversed by a large river considerable difficulty is often experienced owing to mist and fog. Where there are mountains, there is likely to be rain. It is indeed probable that the climate of the theatre of war will, one way and another, much affect the amount of air reconnaissance possible. Perhaps even, on occasions, columns may take advantage of lines of advance known to be more than usually mist-covered. Such areas should be noted beforehand, both by troops and by aircraft.

When fighting takes place in hilly country, observation is often difficult, owing to the tops of the hills frequently being under mist or clouds. In this and other such cases the rule that observation can only be made at heights of over 3,000 ft. must be followed in the spirit rather than in the letter, otherwise observers may "be in the clouds" the whole time and see absolutely nothing.

Heights flown during reconnaissance must, then, be governed largely by the state of the atmosphere, and the consequent ease of observation. Questions of immunity from bullets must not affect this. Such immunity as we have in immediate sight is quite promising. If the flyer, observer and engine are placed under armour they are safe from rifle fire at, say, 3,500 ft., and as regards spars there is, I think, really not very much to fear. The factor of safety is good, as it is only in the unlikely event of two bullets piercing the spar in immediate proximity, and at right angles to its length that serious danger may be apprehended. With reference to wires, it is necessary not merely that two separate wires should be cut, but that they should be interdependent. The only other vulnerable spot, as far as I can see, is the propeller boss.

It was thought desirable in the interests of training to elaborate in detail the results of reconnaissances carried out during last manœuvres. We had also the object in view of showing the army at large what can and cannot be effected at this early stage. The results show what there actually was on the ground, and what was reported as being seen from the air at short intervals, throughout the whole operations. At first it seemed that we had located nearly everything, then as the work grew, it appeared that a certain amount had been missed, but the final result showed that really very little had been missed. I think, on the whole, the information obtained was good.

The elaborate precautions taken by certain bodies of troops, notably the 4th Division, were responsible for some of the failures.

Concealment.—With reference to efforts in concealment made by troops, as a rule those made during a halt on the road are not very successful. Broadly speaking, two methods of concealment are adopted. One consists in taking cover whenever an aero-engine is heard, the other in elaborate arrangements in bivouac. The first method is, on the whole, not a very successful one, owing to the fact that there is always an uneasy look about the road which attracts the attention of a good observer—the tail of a wagon, a deserted cooker, a belated ambulance, gives the show away. Transport and guns disguised as travelling shrubberies are not generally difficult to spot on the march. The second plan, however, meets with undeniable success, and further experiments in this direction will undoubtedly be made.

Photography.—Photography is a most useful auxiliary to the observer, who must, however, not use it to save himself. He must observe just as accurately and intently as if he had no camera. Photography is difficult from an aeroplane owing to the fact that the observer is often rather cramped, and the camera has to be fixed in the bottom of the machine. In my opinion there are considerable possibilities in the science of aerial photography, and it is well worth developing.

Night Work.—A word may not be out of place now with regard to night work. Here the great difficulty is that aviation motors, as I have said, are still far from being really reliable, and, as undercarriages are not very strong, an enforced and hurried landing entails considerable danger.

The lights carried on aeroplanes for flying by night across country are still in an experimental stage. The problems are those of weight, safety as regards fire, lack of glare and good diffusion of light, and range of beam. One way and another, though progress is being made, there is considerable risk attached to night work, especially in England.

To sum up the question of observation, although a very solid all-round advance has been made in day work, night work, in so far as the aeroplane is concerned, has shown no tangible results. Night work at present lies in the scope of the aeroplane which can for certain fly for 14 hours with two engines and fuel for this endurance.

Intercommunication.

Having observed, the observer has now to communicate his information by the most rapid and safe method possible. The question of the best means of intercommunication is a difficult one. It involves problems of both material and *personnel*, and considerable time and experience will be necessary for their solution on sound lines. When we have solved them we shall have minimised the relative importance of many other difficulties, such as questions relating to landing grounds, alighting in small areas, ground communications, and undercarriages.

Wireless.—Wireless will undoubtedly be one of the best methods of transmitting from aircraft the information collected in reconnaissance. It was used with success by the army airships on last year's manœuvres, and the results gained were, I believe, in advance of anything which has hitherto been done either in England or abroad. In hilly or very closed country wireless transmission is essential. But the whole question of wireless in connection with aircraft is a thorny one. There are, for instance, the well-known difficulties in regard to tapping and jamming. Close study and much experiment is necessary. The prospects of using cipher for wireless messages are hopeful, though messages regarding reconnaissance call for quick transmission when sent from a craft moving at 70 miles an hour, whilst the ordinary process of enciphering is slow. A solution has been hit upon which has worked well, but so far it has only been tried with a small number of messages.

Message bags.—On occasion great responsibility must rest upon the observer. He must sometimes decide instantly whether it is desirable to transmit his information direct to the troops most concerned or to the staff. It will often be advisable to drop a message bag with some urgent piece of information in order that the news may be received at once. It requires considerable practice to drop messages in this way, and from some types of aeroplane it is dangerous to do so owing to the possibility of a bag being caught by the propeller. The bags also sometimes do not reach their destination.

On the whole, then, intercommunication still presents many difficulties, and the present more generally adopted system of landing for the transmission of information on the ground must be adhered to for a time.

Handing in Information.

Landing Grounds.—It has often been found a matter of much difficulty to find landing grounds in the vicinity of headquarters, A geat deal depends on this, as a distant landing ground probably entails loss of very valuable time. During manœuvres an umpire was attached to each squadron, whose duty it was to examine every observer's report handed in at the landing grounds. He checked the barograph record before allowing the report to be transmitted, in order to insure that the flight had taken place at such a height as would probably have enabled the information to be safely brought in.

All experience has tended to emphasize the necessity of having the landing ground very close to headquarters. In order to ensure this the best plan is for the officer responsible for ground arrangements to survey the area from the air. The most likely fields are more easily spotted in this way than by any amount of reconnaissance by road. The larger the field the better, but in this connection it is interesting to note that it has been found that some fields which are just too small to be of use as landing grounds for 70 h.p. Renault BE's, are just large enough for M. Farmans. For this reason it is quite possible that in some types of country information obtained by an observer in a M. Farman, will be in the hands of the General more quickly than that obtained in a very much faster craft. In windy weather this does not obtain, for obvious reasons.

For peace training work it is, I think, a good suggestion that all garrisons should look through their areas with a view to recommending one or several good landing grounds in their vicinity. Mayors of towns might also be asked to do the same. Local football grounds would in many cases be suitable, and an undertaking would, of course, be given that the grounds would not be used by the R.F.C. on Saturdays, or when otherwise required. A Royal Flying Corps officer would then be sent round to see if the grounds were really suitable, and draw up a rough report for inclusion in an air-route handbook, which could then be compiled. We have already collected much data for such a book.

There are many areas in the British Isles which demand very slow landing machines if constant mishaps are not to be the rule. Possibly air or ground brakes may overcome this difficulty. The method of altering the angle of incidence while the machine is in flight does not appear to be a sound solution.

Landing grounds should perferably be selected well away from sheets of water or low-lying ground, as it may be found that morning and evening reconnaissance work will be much impeded by mist when the surrounding country is comparatively clear.

To sum up, the bulk of information will be brought in to landing grounds. Their selection is therefore a matter of great importance, and necessitates a considerable knowledge, not only of the requirements of aircraft, but also of the conditions affecting the transmission of information to the staff.

Ground Organisation.

Personnel.—Added experience only goes to emphasise the necessity for a high degree of military training and technical efficiency in the ground personnel, not only of those responsible for attending to the machines, but those employed on other duties, such as transport, intercommunication, &c. Success in war will depend as much on the efficiency and keenness of the ground personnel as upon those whose duties are more essentially in the air. And we should not overlook the fact that although our officers and men are of the keenest, those employed on ground work must be continually subjected to the disheartening effects of seeing the results of their hours of toil brought to nothing by the mischance of a second. To the good air mechanic the machine for which he is responsible is his pride. I know men who regard their machine almost as a living thing. They are intensely proud of its achievements.

We are most fortunate in the fact that our officers and men are splendid: and I may say that such shocks have no effect on their keenness. Their efficiency is indeed increasing more rapidly than we have had a right to expect in view of the limited facilities so far obtained for training. The rapid expansion of the Corps with the consequent dissemination of the old hands has also militated against the immediate development on solid lines of our ground organization, though it is steadily improving with experience.

I would like to add here a plea to manufacturers that they should look with sympathy on the Military Wing of the Royal Flying Corps, and co-operate with it in connection with the employment of good men when they leave the Corps. In two or three years' time some men will be leaving the Service. They will prove—I say it advisedly—to be possessed of a high standard of character and technical ability, and will be available for and anxious to obtain skilled employment in aircraft factories. I will go further, and ask employers not to throw obstacles in the way of men wishing to join the Military Wing or its Special Reserve.

A point brought into relief is that a large number of officers is required, under present conditions, to cope with the work. They are wanted for piloting, observing, gunnery, and command and administrative duties. Hitherto piloting has had a tendency to obscure the great importance of the remainder.

Material.—I think it is often forgotten by soldiers and constructors in connection with casualties of material that we are apt to base our experience entirely on manœuvres. These generally only last a few days, and I think it should be remembered that the repairs and replacements which become necessary in the field do not give a fair indication of the average amount of such casualties to be expected in a longer period of campaigning. Much of the material is new at the commencement of manœuvres, and does not become unserviceable in so short a period, whereas in a longer period parts would deteriorate sufficiently to require renewal in the field. A reliable basis for requirements in this direction is very difficult to obtain. At present we can only guess at the figures.

Sheds.—Some aeroplanes deteriorate more rapidly than others by being out in the open, but there is no doubt that they all deteriorate to very considerable extent, and if the climate is damp or otherwise unfavourable, new planes will be required after each period of manœuvres. More attention to varnishing the wood and exposed metal would probably well repay the time given. A really good waterproofing dope is a want.

An entirely efficient very light portable tent is still lacking. If the ideal in this respect is obtained, considerable expense and deterioration of aircraft might be obviated by at once sending the tent shed to the breakdown, instead of having to go through the laborious process of dismantling the machine, loading it on a lorry, and bringing it in.

Transport and Accessories.—Our designs in the matter of transport are gradually hardening, and are tending towards standardisation and simplicity.

The amount of transport and accessories required in the field is at present large. But this must be in inverse ratio to the reliability and simplicity of aircraft, and to the degree of training of the personnel. We are now, I think, arriving at a sound organisation for the maintenance of aircraft in such particulars as petrol, oil, spare parts, repairs and supplies. Our great aim, however, is to make the maintenance of aircraft as simple as that of the field gun.

In this, as in all matters relating to the Flying Corps, time is required to enable the internal organisation to bear fruit.

Uses of Aircraft.

Having dealt with matters of detail as they at present exist, I will now try to formulate ideas as to the employment of aircraft in war.

Experience places the value of aerial reconnaissance beyond a doubt, not only in calm weather, but practically in all weathers. Also it has been proved that there is no inherent impossibility in maintaining aircraft in the field. An examination of the estimates of the various powers under this head shows how clearly the fact is recognised.

Aerial reconnaissance itself is much; it will however be opposed, and that in the air. Anti-aircraft guns will assist, but probably insufficiently.

This fact being granted, there is the obvious necessity for different types of aircraft. They will undoubtedly be required to perform several distinct duties, and thus the question of the most suitable composition and distribution of flying squadrons to different portions of an Army, is clearly of much importance, both to soldiers and to aeroplane designers.

Does the advanced cavalry require one type of craft? The Headquarters of an Army another? Flanking divisions a third? Will there be a battle squadron? A fast scout flotilla? A squadron to hunt down and destroy airships and to attack aircraft bases? A low-flying armoured destroyer of ammunition parks and supply trains? A heavy transport convoy craft? A breakdown and repair craft?

For all these duties, slightly different types and qualities are required. Even now, one can hardly imagine the tabloid Sopwith taking the rôle of a Sikorski argosy.

Standardisation.—Whatever the future may bring forth, I would like to emphasise as a principle, the necessity for all possible standardisation in the reproduction of any one design. We must weigh most carefully the merits of any new design, but at the same time check any unsound diversity. Standardisation of types is at present undesirable, but standardisation within types is essential. Every new pattern and every fresh modification spells increased stores, increased transport, and therefore loss of readiness and mobility of the force as a whole. Mobility and readiness for instant action at any time must be the essence of being a Flying Corps. A Flying Corps which is not in the field when the flag falls, if not before, has lost a large proportion of its utility.

But to return to types. I do not suggest that a rapidly developing science like aviation may not necessitate the unhesitating abandonment of one design for another, but the guiding principle must in any case be that of the fewest possible types compatible with the object to be attained. With each new type, innumerable attendant difficulties of maintenance, replacement and storage are forced upon one. This question is one of less importance in the case of the Navy, as it has no difficulties of land transport, but it is vital to an Army.

Aerial Fighting.

Hitherto, progress in military aircraft has had to do mainly with reconnaissance machines, and these have already been dealt with at considerable length, but the fighting aeroplane now claims attention.

The problems raised or inherent in the question of aerial warfare are very complex. Command of the air will undoubtedly be sought. It will, as undoubtedly, be difficult to obtain. The third dimension—climbing—remains one of the principal stumbling blocks.

There are two schools of thought regarding fighting in the air. The one holds that if an aeroplane is to flight, it must carry a passenger, gun and ammunition. It will be so large and heavy that it will be slow, also it will lack the means of intercommunication necessary for combined action, and it will be unable to come within range of a fast scout. The latter will come, get its information, and go, unmolested. It would appear that, for a time at all events, the fast scout will have the advantage. It depends largely on the number of fighting machines available.

The other view is that fighting in the air must occur if results are to be obtained. Given that one side has sufficient fighting machines, it should be impossible for the unarmed scout to approach the point where it desires to glean information.

We have as yet nothing to go on in this matter. It is however, of great importance that thought should be directed, by all concerned, to the problem, and to that of action against troops on the ground. Aerial tactics will take much working out, and an aerial building policy can only properly be based upon them.

Recognition of Aircraft.

A first requisite is the recognition of friend and foe. No system has yet been evolved to ensure the distinction and recognition of aircraft either from the air or from the ground. Instances do and will occur of rifle and gun fire being directed at aircraft, but it seems generally that troops refrain from firing owing to the impossibility of recognising friendly from hostile aeroplanes, and from fear of firing at friendly ones.

Reliance cannot as yet be placed on recognising hostile aircraft by their type. Moreover, as the speed of aeroplanes increases, the distances at which they must be identified in order to stand any chance of hitting them also increases.

Black and white stripes painted on the under surface of the planes are distinguishable at two or three miles, according to the light, but an aeroplane cannot be recognised at any distance. It is

as difficult as it is important that a satisfactory method should be found, in order that it may be possible to issue orders to the troops to fire at any aeroplane, not definitely identified by some means as friendly. Various means have been suggested, and some attempted, for ensuring this, but so far with no marked success.

Summary of points brought out, requirements and suggestions for Constructors.

I will now endeavour to summarise the points which I have tried to indicate during the course of this lecture.

First, I would mention the paramount necessity for a really reliable, suitable, high-powered, and silent engine.

The second is that of factors of safety under the conditions of present aerial flight.

Third, the apparent advisability of flaps as opposed to warping.

Fourth, a better landing gear to sustain the shock of landings such as must often be made in a Service machine.

Fifth, progress required in the directions of strength and simplicity in design and construction, so as to reduce the time and labour now required to keep aeroplanes and engines fit for constant service.

Sixth, time would be usefully expended on experiment for better methods of intercommunication between aeroplane and aeroplane, and aeroplane and the ground.

Seventh, standardisation. There is method in the military insistence on limiting types to those absolutely essential and in requesting a rigorous standardisation of parts.

Eighth, a large type of machine with, if necessary, multiple engines and propellers is now required.

Ninth, invisibility.

Tenth, air or ground brakes.

Conclusion.

In conclusion, from the military point of view, I am glad to think that the words Sir John French used when kindly presiding at my lecture last year have been to a certain extent taken to heart. He said : "Aviation is one of the most important subjects to which the modern officer can pay attention at the present day." Interest in and knowledge of the subject by both Services have increased, and even public apathy has shown occasional signs of movement.

Aviation has advanced, and is still advancing at an unparalleled rate. May I quote to you the leading paragraph of the instructions issued in September, 1910, for the manœuvres of that year? They already read like Chaucer: "As this is the first occasion on which aeroplanes and dirigible balloons have been employed in this country for military work, their employment is largely a matter of experiment ; and as the science of aerial navigation is yet in its infancy, unreal conditions which would not obtain in war must be observed for the safety of the aeronauts and their machines."

This, I think, constitutes a landmark. It is difficult to realise that these instruction were issued less than three and a half years ago. Where there were a very few isolated and groggy machines quite unsupported by ground organisation, there are now squadrons. This progress is producing new strategical considerations affecting radically all military arrangements and dispositions.

The aerial scout is well evolved.

The "fog" of war is already turning to mere mist.

Now the fighting machine which will eventually affect the destinies of nations is materialising.

Very soon we shall have aeroplanes with considerable weight-lifting capabilities, with a speed of say 100 m.p.h., and a capacity of 700 miles. They may be fitted with transparent wings. With such machines the flanks of even modern armies will be easily turned, vital arteries of supply, well in their rear, easily gained, the words "overland" and "oversea" will have little meaning.

It appeals very much to the imagination to think of a squadron of almost invisible and silent aeroplanes launched to raid some vital spot of the enemy's organisation.

A similar squadron, if armoured, might perhaps safely fly low over parked ammunition and supply wagons, and sow explosives amongst them.

I do not agree that these ideas are the product of too vivid an imagination. We have now the ability to keep the air in most weathers. Great weight-lifting aeroplanes are an accomplished fact. I would therefore urge British manufacturers to develop their designs for large machines ; there can be no doubt that such machines will be required in war. I am aware that however good the will, bricks cannot be made without straw. Nevertheless, a year's, or even a few months', advantage now may mean much later.

This country is certainly not yet first in aerial strength, but the year's effort has been productive of such tangible progress as to show that we could attain aerial supremacy if we really meant to. Do we mean to? Believing as I do that land fighting and sea fighting will eventually wait on aerial fighting, I am convinced that we should make every possible effort to attain that end : and this effort should be made at once ; we cannot afford to delay.

THE DISCUSSION.

IN opening the discussion, Mr. Joynson-Hicks observed that he was intensely interested in the Author's concluding remarks, but he would have liked to have had some information as to the future organisation of the air squadrons, whether they were or were not to form an integral part of an Army Division exactly as were the cavalry and artillery at the present time, and what relationship there would be between the Flying Corps of the Army and that of the Navy. He said that victory or defeat in battle would always depend upon the possession of information as early as possible, and the aeroplane could supply that in a way that no cavalry could.

Captain Waterlow observed that the Author had made no reference whatever to airships, and having spent so many years of his life on their development he much regretted this, especially as they were now handed over to the Admiralty. He hoped that before long they would have them back again, as the capital expenditure involved by a later transfer would prevent this from happening if deferred for some time. There were one or two points he would like to mention, in connection with what had been done with airships. During the last manœuvres they went out in a heavy mist, so thick indeed was it that at 1,000 ft. high they could hardly see the ground, and after making observations, messages were sent by wireless to headquarters. Within seven minutes of their despatch, these reports were received by the General, and in view of the fact that these had to pass the Censor and were transmitted by ground telephone, the performance was very creditable. Further, they had been able to transmit and receive messages from one airship to another—an achievement that had not previously been accomplished. On an airship the crew would work in reliefs, and there was not that fatigue to which Colonel Sykes had referred. His airship of the future was a very large vessel, travelling at high speeds, say from 70 to 80 or even more miles per hour, and he warned his hearers not to dismiss airships from their speculations, although he regretted to say that many people knew absolutely nothing about them yet would not allow anybody else to know anything about them.

General Henderson observed that in his opinion the control of aeroplanes in war should be invested in one person—the Commander-in-Chief—because of the great distance between the engaging forces, whereas the various divisions would be within two or three minutes' flight of each other. Later on, when the armies were in close contact, squadrons or flights might perhaps report directly to the divisions. In times of peace, he thought that the attachment of aeroplane squadrons to Army divisions would be most extravagant and not conducive to the best results. But this was a new organisation, and it would be most undesirable and pedantic to lay down hard and fast rules beforehand as to the procedure to be followed. He said that Colonel Sykes had spoken of the success of the fast flying aeroplane, but he would mention that when Prévost landed his Deperdussin in the Gordon-Bennett Race, he ran for nearly a mile on the ground after landing, and he hesitated to surmise what would be the value of information acquired by a scout should this happen in some parts of the country. There was a limit to the range of speed. At present there was no fighting aeroplane that could stop a good scout ; and if his audience wanted to know which country had the fastest aeroplane—it was Great Britain.

Mr. Holt Thomas said that Military Aeronautics in this country had made enormous progress during the past two or three years. We now had the fastest machines, and our pilots on the average were better than those abroad, except for foreign picked men. In France on a windy day there was often no machine out, but on the manœuvres carried out last year in this country the machines were often blown to a standstill.

Major Baden-Powell remarked that he failed to see what advantage there was in carrying a large crew, although it might be possible to land a number of men for the purpose of destroying stations and cutting wires, or perhaps transfer bodies of troops to various spots on the field of battle.

The Chairman (Lord Sydenham), before calling upon the Author or his reply, observed that the development of aeronautics for military purposes had greatly extended the control and the information at the disposal of the Commander-in-Chief, and he dilated upon the tremendous possibilities that might have resulted had such machines been available at different crises in the history of the world. He said that while the aeroplane was at the present moment of greater importance than the airship, the future possibilities of the latter should not be forgotten. He emphasised the importance of possessing a sufficient number of trained pilots and observers, as well as aircraft, ready for immediate service.

In a brief reply, Colonel Sykes said that the scope and breadth of his paper prevented him from giving attention to the question of airships. He thought that one should not dogmatise on any matter in connection with military aviation, but should keep a perfectly open mind, and see both sides.

MR. B. C. HUCKS AT HULL.

FLYING at Hedon suggests another familiar aerodrome; but Mr. Hucks hardly expected to be reminded so forcibly of Hendon at its best when he visited the Hedon Racecourse, at Hull, on Thursday, Friday and Saturday last, the 5th, 6th and 7th inst., to give demonstrations of looping-the-loop and upside-down flying. The enclosures were lined with enthusiastic spectators, there was hardly a breath of wind, and the sun shone from a perfectly cloudless sky. Even midges were misled by the summery conditions, and came forth in force and aviated with irritating vigour.

In addition to his looping Blériot, Mr. Hucks had also brought his 80 h.p. Blériot two-seater machine, which had been housed in a barn near Rochdale, since Mr. Hucks landed there a few weeks ago, after a terrible fight with a gale of wind and rain.

Promptly at three on Thursday Mr. Hucks rose in his passenger machine and gave a magnificent exhibition of steep-banking spirals, steeple-chasing along the front to the enclosures a few feet above the ground. Since Mr. Hucks has been flying the looping machine, his handling of the two-seater type has noticeably improved, and his "banks" approach very near to the vertical. He landed in order to take a passenger on board, and after another flight he changed over to his looping machine. In a few minutes he was high in the air, and during the demonstration he completed six loops and also did an "S" dive, remaining on his back for sixteen seconds. Then followed another passenger-flight. This finished the flying for the day.

On Friday the weather was again bright, although the wind proved rather troublesome. This did not, however, interfere with the flying, for Mr. Hucks gave further demonstrations with his two-seater machine, and on the looper completed eight more loops and another upside-down flight.

In the morning Mr. Hucks had flown around Hull and district, carrying Mrs. Craig and her little five-year-old son, the flight lasting twenty minutes and being watched by many thousands of people. On the previous day Mr. Hucks also carried a representative of the Hull *Daily Mail* over Hull, but owing to the foggy conditions he was not very clearly visible.

On Friday afternoon Mr. Hucks also took as passenger Master "Billy" Craig, who was attired in a complete miniature airman's suit, in a flight which lasted over ten minutes, during which Mr. Hucks indulged in some of his steep "banks," to the youngster's high glee, who frequently waved his hand when passing the enclosures. This makes Master Craig's fourth flight.

On Saturday morning there was a wind of over 50 miles an hour, which increased to over 60 at mid-day, but dropped a little by the advertised time for Mr. Hucks to fly. A huge crowd turned out, but a good many were very dubious about seeing any flying at all. At 3.30, however, Mr. Hucks took up his two-seater, and although he found the wind gusty and was troubled by the rain, he was able to give a fine ten minutes' exhibition flight. The looping monoplane had in the meantime been wheeled to the far end of the course, head to wind. Having been firmly strapped in, Mr. Hucks gave the signal to release the machine, when it immediately shot up vertically for 100 ft., where the wind was not so strong, and enabled Mr. Hucks to make a little headway. Having reached a height of 800 ft., he did a double loop, during which time he had been blown right outside the field. Fighting his way back to the centre of the course he did a further two loops, and, before he landed, had completed a total of eight for the afternoon, bringing his grand total up to date to 148.

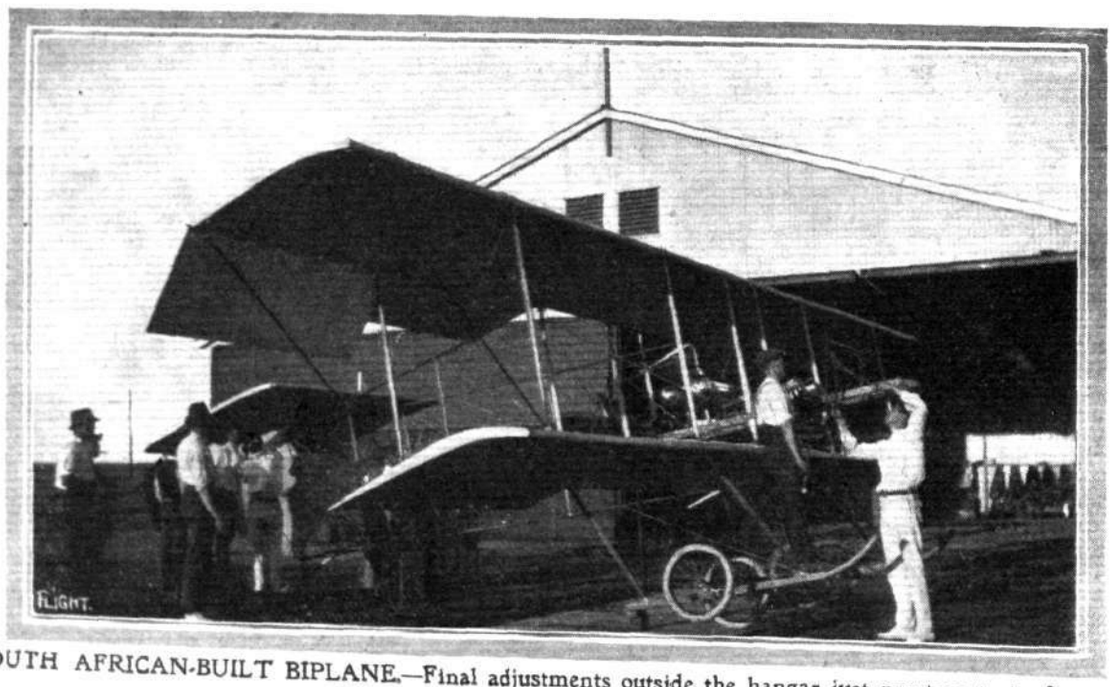
When looping in a strong wind, Mr. Hucks always dives with the wind blowing diagonally across the machine. It seems to be the impression that it would be better to start the dive head to wind; but Mr. Hucks points out that, if he did this, when he reached the upside-down position, he would lose all his forward speed and "pancake" badly.

On landing, the enthusiasm of the crowd knew no bounds, and it was with difficulty that the spectators were prevented from storming over the railings and mobbing Mr. Hucks.

A SOUTH AFRICAN-BUILT BIPLANE.

IN sending us the two photographs appearing on this page and page 160, a Kimberley correspondent writes as follows:—

"I enclose two photographs of the South African-built biplane referred to in the communication you received and published (in FLIGHT for November 1, 1912) from the late E. W. Cheeseman. This machine is of special interest because it has been recently purchased by the South African Government, and is their first machine. It is also the first machine built in S.A. which has flown successfully. Mr. Paterson recently made a flight over the Kimberley Aerodrome with this machine of 2 hours 10 mins., covering 120 miles. Unfortunately the Paterson Aviation Syndicate is liquidated, and the beautiful aerodrome will be made no further use of until some enterprising firm turn their attention to the possibilities of success in South Africa."



A SOUTH AFRICAN-BUILT BIPLANE.—Final adjustments outside the hangar just previous to its first ascent.

Testing the "Wight" Seaplane.

SEVERAL test flights were made with the "Wight" seaplane on Tuesday and Wednesday of last week. Various propellers were tried and we understand that the best result showed that the speed of the machine had been increased up to 72 miles per hour. Mr. Gordon England was the pilot, this being the first time he has flown since his accident; although his leg was very stiff and he had considerable trouble in walking, he had no difficulty in flying.

FLIGHT

FOREIGN AIRCRAFT NEWS.

Parmelin Crosses Mont Blanc.

AFTER waiting at Geneva for some time, Parmelin succeeded in flying across Mont Blanc on Wednesday. Leaving Geneva at 1.39 p.m. on his Deperdussin monoplane, he made his way across the highest peak of Mont Blanc, which is 15,782 ft. above sea level, and after covering 25 miles had to land owing to the fog near Aosta, instead of continuing to Turin as intended. The greatest height attained was about 17,500 ft.

Pegoud Makes 52 Loops.

IT is reported from Agram, in Austria, that during his exhibitions there on Sunday afternoon, Pegoud looped the loop no fewer than 52 times.

French Military Aviators Leave Crotoy.

THE French military authorities having decided to do away with the military aviation school at Crotoy, Capt. Gerard and Lieut. Vuillemin, on the 5th inst., flew to their new stations at Rheims, while Lieuts. Le Bihan and Thenault went to Douai.

A Fatality at Villacoublay.

WHILE making some experimental flights at Villacoublay on the 5th inst., a biplane, piloted by Raoul de Reals-Mornac fell from a height of 200 metres. The pilot was killed on the spot.

A Nieuport Superior Pilot.

ON a Nieuport monoplane, Sergeant Verwitch on the 4th inst. made the second qualifying flight for a superior *brevet*, flying from Villacoublay to Rheims and back. He had previously carried out the first test over the triangular course, Villacoublay–Orleans–Chartres.

More Nieuports for French Army.

BEFORE a military commission headed by Capt. Destouches, three 100 h.p. Nieuport monoplanes were on the 4th inst. put through their official tests at Villacoublay, the pilots being Espanet, Gobe and Marmier respectively.

Mme. Pallier to Fly Nieuport Monoplane.

HAVING done all her flying up to the present on an Astra biplane, Mme. Pallier has decided to turn her attention to the monoplane. She is now at Villacoublay practising with a Nieuport monoplane.

and Mme. Richer a Caudron.

HAVING completely recovered from the effects of the accident which befell her in August, Mme. Richer has decided to again take up flying, and she is now at Crotoy, at the Caudron school.

Changing Places in Mid Air.

BY way of demonstrating the stability of the Maurice Farman type of biplane, an interesting experiment was carried out at Buc on Monday. On a military machine with the ordinary system of control, Maurice Farman ascended, accompanied by Renaux, and during the flight he changed places with Renaux, who piloted the machine to the end of the trip.

Long Flight on a M. Farman.

A FINE non-stop flight of 250 kiloms. from Buc to Bourges was made on a De Dion engined M. Farman by Col. Barres, accompanied by Col. Caron, on Thursday of last week. Also with Col. Caron, Col. Barres returned to Buc on Monday.

Baron Cederstrom Flying a Biplane.

THE well-known Swedish pioneer, Baron Cederstrom, who has hitherto confined his attention to monoplanes, has recently spent some time at the Farman school at Buc, familiarising himself with the control of the Farman machines. On one of the H. Farman biplanes, on Monday, he flew with a passenger from Buc to Etampes and back.

Etampes to Verdun on Farmans.

AFTER taking delivery of two H. Farman machines at Etampes, an officer-pilot and a sapper, each with a mechanicien, mounted the machines and flew on them to their station at Verdun, on Monday.

M. Blériot Unsuccessful.

DESPITE a very strenuous campaign carried on by means of handbills and other election literature dropped from the sky by Blériot pilots, M. Blériot was unsuccessful in his candidature for Seine General Council. His opponent, M. Perinard, polled 2,072, while M. Blériot's poll was 1,852.

An Aerial Post for Russia.

THE Imperial Aero Club of Russia is endeavouring to obtain official sanction to organise an aerial post. It is proposed to charge an extra 50 kopecks on letters carried by the aeroplanes, the proceeds to be devoted to the National Aerial Fleet Fund.

Fatal Accidents in Germany.

A NON-COMMISSIONED officer, named Foellmer, was killed at Schleissheim aerodrome on the 4th inst. through his machine falling 200 metres on to the barracks.

At the Waune-Herten aerodrome in Westphalia on the 7th inst., a pupil—Hugo Frank by name—in making a steep landing at the conclusion of his first flight, received injuries which terminated fatally.

An Etrich monoplane, piloted by a pupil named Degner, who was making his first solo flight at Johannisthal on Tuesday, was crashed into by a biplane piloted by Sedlmayr, who was accompanied by Lieut. Leonhardy, which had just left the ground. The machines were at a height of about 199 ft. when the collision occurred. Degner was killed on the spot, while Sedlmayr and his passenger were seriously injured.

Turkish Officers Flying to Cairo.

FOLLOWING a suggestion of the Turkish Minister of War, Capt. Fethi on a Blériot and Lieut. Nouri on a Deperdussin, each with a passenger, started from Constantinople on Sunday morning to fly to Cairo. Capt. Fethi made a first stop at Ada Bazar, while Lieut. Nouri got to Isnik, Broussa.

Beachey to Demonstrate the Langley Machine.

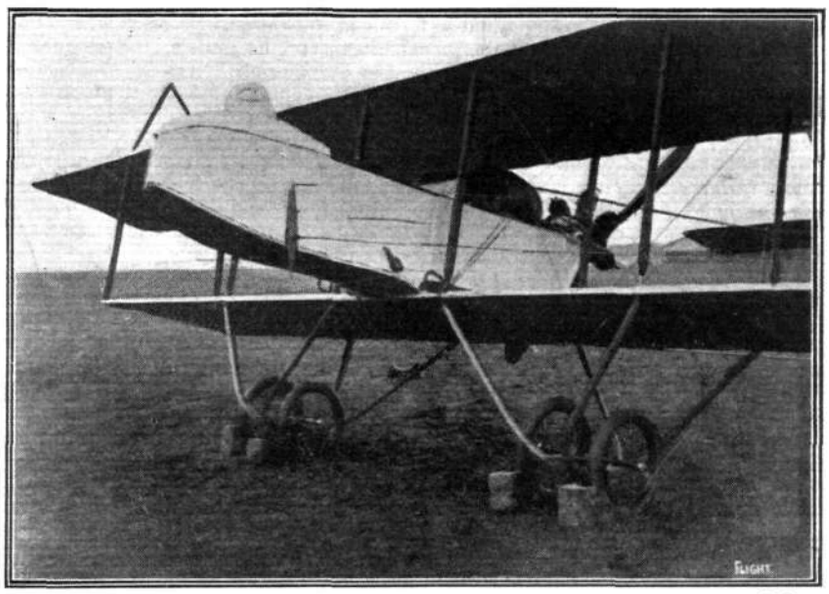
LINCOLN BEACHEY recently offered to the Smithsonian Institution to fit a modern motor to the flying machine designed and built by the late Prof. Samuel P. Langley, and demonstrate its flying possibilities. While the institution will not allow the original machine to be taken from its place in the museum, they have offered to give every facility to anyone who would wish to make and test a perfect reproduction in order that Langley's real success might be shown.

An American Military Pilot Killed.

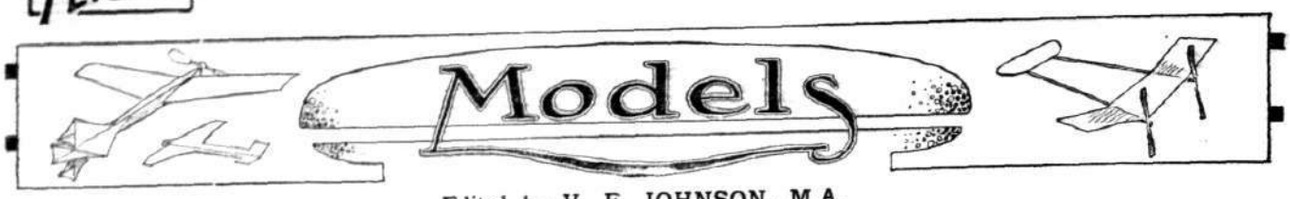
A CABLE message from San Diego, Cal., states that the American Army pilot, Lieut. H. B. Post, was killed on Monday, through his biplane falling from a height of 500 ft. when flying over the bay. Lieut. Post recently made a fine cross-country flight of 120 miles, and also beat the U.S. Army altitude record.

The Gordon-Bennett Balloon Race.

ARRANGEMENTS have been made for the Gordon-Bennett Balloon Race to be held this year from Kansas City, and the start will be on October 6th. The city authorities, besides providing free gas, and the labour necessary for inflating the balloons, are offering $7,200 in prizes, and are making every effort to ensure that the event may be a thoroughly International one.



NEW H. FARMAN CHASSIS.—It will be seen that it consists of four pairs of "U" steel tubes of stream-line section, each pair of which converge at their lower extremities, where they are connected by short transverse distance pieces. It is claimed that this machine can be converted into a hydro, by simply substituting floats for the wheels. For resisting transverse strains when landing with a side wind it would seem that this chassis is an improvement on the older type H. Farman chassis.



Edited by V. E. JOHNSON, M.A.

The Dependence of Aviation on Model Aeroplane Work.

By F. HANDLEY PAGE.

(*Concluded from page* 128.)

Now that I had a suitable design of a model upon which to experiment, and had made all the necessary arrangements for testing it, it was necessary to plan out a proper scheme of tests to be carried out on these models to obtain the data that was required.

In these experiments the lifting capacity of the planes as well as the stability effects obtained, had to be tried at one and the same time. There were made up many types of planes; some of them of the type which we are making at the present time, and others with the ordinary square ended planes, in this case the model being provided with a tail. The best results which we obtained were with the plane of the type similar to the present one.

Here it is necessary to give a word of warning to the experimenters. It is necessary when comparing results on different types of planes that the standard of workmanship should be exactly the same on each model. If not there is the probability that the model which has the inferior aerodynamical qualities may prove the better flyer owing to its being made better. It is necessary, therefore, to most carefully examine the models to see that each has been made as well as possible.

Turning now to the results which were obtained with these model experiments, it was found that if the plane ends were swept back far enough, and there was a sufficient difference of angle between the tips and the main lifting portion of the plane, the model was very stable fore and aft. The reason for this is very easily seen if you refer to the Turnbull experiments of which I have already told you. The centre of pressure moves forward when the angle decreases, and backward when the angle increases, as found by Mr. Turnbull with his plane of double curvature.

With a plane of single curvature with the concave side facing downwards, the centre of pressure moves backwards up to an angle of from 15° to 20°, and thus there is a change in the results and the centre of pressure moves back again. It is necessary with this type to employ a tail so as to obtain the same movement that the centre of pressure has with a plane of reverse curvature.

It is most important when designing a plane with a reverse curve that the negative angle of the rear portion should be exactly right both in length and angle, otherwise there is a tremendous loss of efficiency. This required amount it is only possible to find out by experiment.

In carrying out these experiments, we found many things that were not necessary in the planes which we had originally fitted to the models, and that to obtain the best results as regards stability and lighting power, certain curvatures and so forth had to be used.

So far I have dealt mainly with the lift experiments on the models, but when the plane was found that gave the best lifting result, it was then that the second problem had to be dealt with—namely, that of stability.

In this connection a great many devices were tried with vertical fins placed at different points on the longitudinal axis of the model, mainly with a view to damping out lateral oscillations.

It was found that if the plane had a sufficiently large "wash out" and was thick in the centre, a vertical fin between the planes was not necessary. A vertical fin at the tail, of the proper dimensions, was exceedingly useful for keeping the machine facing the wind, and with this small adjustments could be made, and the machine kept on a straight course.

I have taken this experiment as an illustration of the way in which tests may be carried out to obtain certain definite data to full-sized machines. They form, when the designer does carry them out, most useful supplementary work to the research work which is now carried out in wind tunnels in the laboratory.

In this connection it is very interesting to note, that with the composite plane upon which I experimented, the centre of pressure found in the model experiments came at exactly the same point as the resultant centre of pressure on the plane, found by dividing the plane into a series of sections, and for the angle at which the plane was flying determining its centre of pressure from wind tunnel results.

From the model experiments was constructed our first full-sized machine, which was known as the "Blue Bird," it having been painted with a blue paint. The "Blue Bird" was followed by the "Scrap Heap," so called because the machine fell to pieces; then came another to which no name was given; following it was the "Antiseptic," named by the late Mr. Edward Petre, owing to the machine having been painted with a non-rusting paint. Then there is our old 50 h.p. monoplane, built in 1911, and still flying, known as the "Yellow Peril."

I should like to give you some suggestions as to the way in which your future model work might be extended so that experimental results of value might be obtained.

There is probably not very much more progress to be looked for in the improvement of the lifting capacity and the diminution of resistance of ordinary planes. Experiments have been, and are still being, carried out all over the world, and plane sections have been evolved which have lift drift ratios of very high value. It is probable a maximum of one in twenty to one in thirty will be reached shortly. There are, however, great improvements to be effected as regards the stability of machines. It is the carrying out of tests for the improvement of this feature of machines that should call your attention for the coming year. It is a subject that can only be properly dealt with by model flying tests, and it is one therefore that should demand your closest attention.

There seems to be a particular way in which machines of the uture may develop. The modern efficient flying machine will have to be efficient, travelling at a high speed, and capable of a wide speed variation, and to obtain these results to the fullest effect the propeller will have to be placed in the rear of the aeroplane.

To understand the reasons for this, let us consider how the power required to drive the aeroplane through the air is split up. Part is used in overcoming the resistance of the planes to their motion through the air, and the other part for that of the body planes. No matter at what speed you fly, planes for a given lift will have approximately the same resistance, provided that they are designed to fly at their most efficient angle at this speed. It is, however, different with the body resistance. Even if the *fuselage* is most carefully streamlined, and pilot, passenger, and engine, &c., all carefully enclosed, yet the higher the speed at which it is driven through the air, the higher will be the resistance which has to be overcome.

The characteristics of a slow-speed machine will be that the largest proportion of its power will be necessary to drive the planes through the air, whilst in the high-speed machines the power will be required for the body. In the slow-speed machines, the propeller blowing in front upon the *fuselage* increases its small resistance a negligible amount.

In the high-speed machine the body resistance, already a serious item, is increased considerably if the propeller is placed in the front of the machine. It will pay them to place the propeller in the rear in the high-speed modern machine, just as it pays in a steamship, where the whole of the resistance is the body and wave making resistance.

From the point of view of Naval and Military requirements, the propeller behind the machine is much the better type. It offers such splendid opportunities for observation or for firing a gun. From the point of view of both efficiency and service, the propeller-behind machine scores every time.

There are many ways in which a propeller-behind machine may be made:—

1. As in the Maurice Farman machine, with a tail boom and outriggers surrounding propeller.
2. As in the Paulhan Tatin or the old Petre aeroplane, with the propeller at the extreme end of the *fuselage*.
3. With the split type *fuselage* and the propeller revolving on one of the fixed tail booms, as in the Grahame-White Military aeroplane shown at the Olympia last year.
4. With a tailless plane and swept back wings.

In the Farman machine the increased efficiency obtained by the propeller position, is to a large extent nullified by the large resistance of the rear frame-work exposed to the air. This type is also not quite so easy to handle when built for hydroplane work as a *fuselage* machine.

The second type with the propeller at the tail has a large moment of inertia owing to the heavy tail shaft, and is weak constructionally. The propeller position necessitates the tail being a long way off the ground, and this leads to an increased length of chassis struts with a consequent increase in resistance.

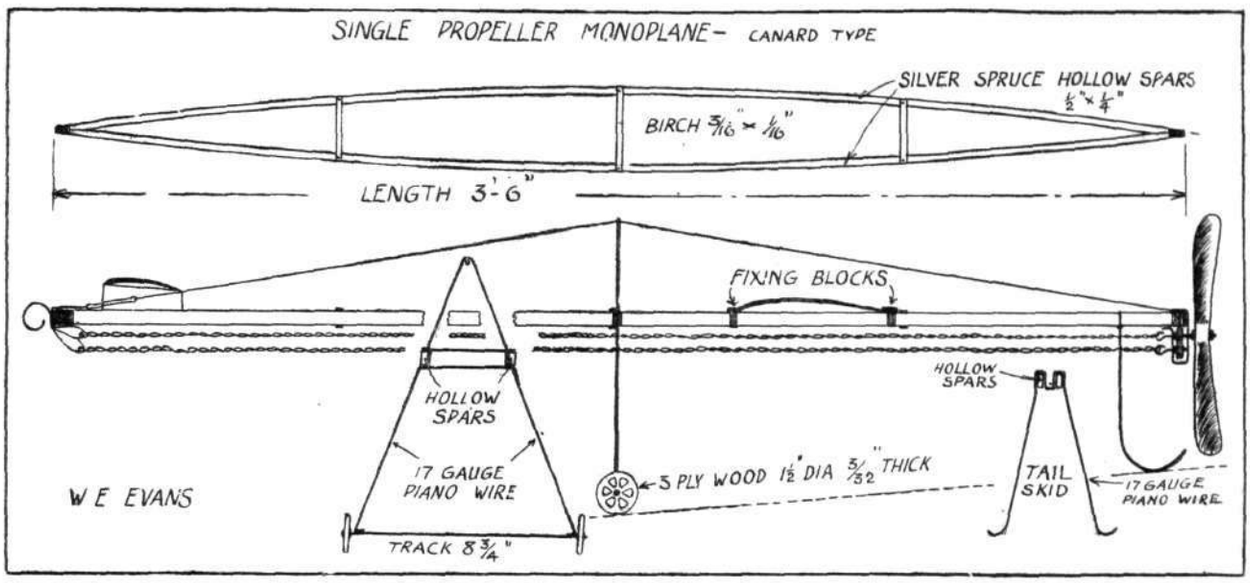
Type 3 is also very weak mechanically, and heavy.

Type 4 would appear to have the best future, as there is nothing in the rear of the propeller to detract from its efficiency, and it is a type which has good longitudinal and lateral stability. It is, therefore, in this direction that I think progress will be made.

Finally I would ask you devote some more of your time to scientific research work with your models: improving their gliding angles, their lifting capacity and their stability. You can always improve your model by cutting down its weight, but if this is done at the expense of its strength it is no real improvement. Improvement should move along the lines of better aerodynamical qualities; therefore, it is in this direction that I hope you will experiment and carry out research work.

Mr. W. E. Evans' Single Propeller Record-Holding Model.

We have much pleasure in publishing the following particulars and illustrations (supplied us by Mr. Evans) of this model, which holds the official British records *both* for distance and duration, the former being 290 yards and the latter 64 secs.:—



The *fuselage* is built up of two silver spruce hollow spars blocked at the centre and ends, of rectangular section ½ in. high by ¼ in. wide, and 3 ft. 6 ins. long, planed very thin so as to weigh only ½ oz. each. The centre is bowed to the extent of 3 ins., and held in position by two pieces of $\frac{3}{16}$ in. by $\frac{1}{16}$ in. birch glued and pinned above and below. Similar pieces for stiffening are also fixed across midway between the centre and the ends. The hollow spars are chamfered one side at either end to form a joint which is glued and bound with thread.

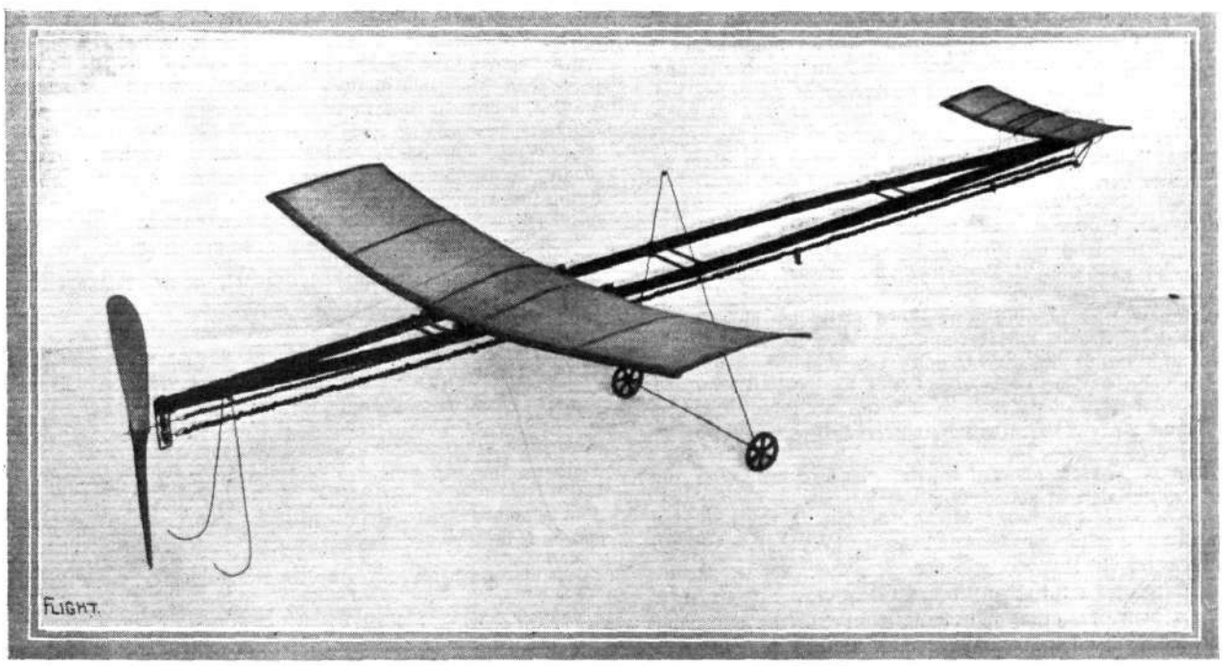
The gear, comprising two ½-in. cog-wheels, was specially made by Messrs. J. Bonn and Co., the weight of which (complete with spindle for propeller), is only 6 drams. It answers its purpose admirably. The front hooks, or rather loops, and protector is made of 17 gauge piano wire in one piece bent to the necessary shape and soldered, and then bound on with thread.

The chassis, also of 17 gauge piano wire, is triangular in shape being 11 ins. from axle to top and having a base of 8 ins. This extends $3\frac{3}{4}$ ins. above the top of *fuselage*, and forms a kingpost for the necessary straining wire on top. Genuine piano wire only should be used for this, otherwise the longitudinal stability of the model becomes unreliable owing to the strain of the rubber underneath. The wheels are of 3-ply wood 1½ ins. in diameter and $\frac{3}{32}$ in. thick, fret cut and fitted with hubs made of brass tubing with a collet soldered on either side to make the tubing quite firm. Their weight is one dram each.

A double skid of 17 gauge piano wire is fixed at rear of *fuselage* to allow ample clearance for the propeller.

The main plane is 27½ ins. span and 5½ ins. chord, made of $\frac{3}{16}$ in. by $\frac{1}{16}$ in. birch and covered with fabric. The weight of this is 10 drams. The dihedral is a curve instead of the usual V. The camber is ½ in. in the centre and ¼ in. at the tips, these having a very slight negative angle of incidence. Two of the ribs are fixed 1½ ins. on either side of the centre to rest on the *fuselage*, and allow a firm fixing. When birch plane edging is glued and rivetted, holes should always be bored for the fine pins just a tight fit, to avoid splitting the wood.

The elevator is 9 ins. span and $2\frac{3}{4}$ ins. chord, and weighs 3 drams.



A single screw r.o.g. monoplane by W. E. Evans.

It is made of $\frac{5}{16} \times \frac{1}{10}$ birch, covered with fabric, and raised 1 in. above *fuselage* by means of a framework of 22-gauge piano wire.

The propeller is a Bonn's Invincible type 9½ ins. diameter, weight 3 drams, and has an effective pitch of 14 ins. It is driven by two skeins of four strands each of ¼ in. strip rubber. Greater consistency has, however, been obtained with a similar propeller of 9 ins. diameter, and an effective pitch of 13½ ins. with the same amount of rubber.

The model has an inclination of 1 in 12, but I think 1 in 8 would give a greater altitude in flight. Its best performances to date are the distance and duration records for this type of model, namely, 290 yds. nett, measured in a straight line, and 64 secs. The time occupied by the distance flight was 57 secs. The total weight of the model is 4⅝ ozs., and with the surfaces totalling 176 sq. ins., the loading works out at 3⅞ ozs. per sq. ft. It is exceptionally stable, both laterally and longitudinally, and has been flown regularly in all weathers without breakage of any sort since last October.

The South-Eastern Model Aero Club's Exhibition.

By H. G. WILKINSON.

On Thursday, January 29th, in response to an invitation from the Hon. Sec. of the S.E.M.Ae.C., I paid a visit to the exhibition of model aeroplanes organised by this club, and after what I saw at the Central Hall, Peckham, I should think the future for the club looks very promising.

The extraordinary number of models exhibited was astonishing, and the great assembly of visitors a proof of the interest now being taken in flying, particularly the model aspect, where it is properly encouraged, as is evidently the case in this part of South London.

Mr. Clark, the Secretary, was good enough to personally conduct me round the Exhibition, and fully explained the chief points of the various models, foremost of which being a large steam-driven monoplane shown by Mr. Groves. This model was of the front elevator type and measured some 5 ft. across, and has, I understand, made numerous successful flights. Another large "engined" monoplane called "the Gnat" was exhibited by Mr. J. Dollittle. This was distinct from Mr. Groves model in that it was of the "propeller first" variety, and the engine was driven by compressed air instead of steam. Considerable interest was created when Mr. Dollittle demonstrated the capabilities of the multi-cylinder engine, which worked splendidly. Another model which appealed to a number of visitors was a scale copy of the well-known "Morane-Saulnier" monoplane, complete in nearly every detail.

Mr. Plummer, the constructor, is to be congratulated on the fine workmanship displayed in this machine, and several others, comprising a large self-rising tractor monoplane (which proved successful in the last "Trophy" competition), a splendid biplane fitted with a four-bladed tractor-screw and a twin propeller duration monoplane.

Mr. Clark exhibited a model of a "Blériot" similar to the one used by Mr. Hucks in his recent demonstration of "looping the loop" at Hendon and elsewhere. The controls on this machine came in for a lot of attention, as everyone seemed keen on becoming efficient "pilots" there and then, working the warp and elevator levers and rudder bar.

A very large rubber-driven tractor model weighing nearly 2 lbs. was shown by Mr. Westwood (the *fuselage* of this being, I am told, a complete departure from regular model practice), and Mr. Prance exhibited a cleverly-designed single-cylinder engine suitable for either steam or compressed air.

Other models worthy of note were those made by Messrs. A. Chinnery, Brunton, Brown, L. Morris, C. and A. Beere, and F. W. Evans. In addition to the above, one item of more than usual interest to model-aeroplane constructors was the partially-finished 4-bladed propeller shown by Mr. A. Nicholls. Each of the blades was in a different stage of construction, showing the whole process of making this type of propeller.

The writer is looking forward to the pleasure of seeing the majority of these models in actual flight, and if the foregoing particulars prove of interest to your "Model" readers, I shall be glad to communicate the results of the tests to you. [We shall be pleased to receive these results.]

Model Club Exhibits at Olympia.

We are very glad to see that up to date, eight clubs have decided to take club stands at Olympia. We cannot see any real and consistent reason why every model aero club in the neighbourhood of London, at any rate, should not take a stand; with the provincial clubs it is of course rather a different matter, since there is the question of distance and consequent expense to be considered. But even here, if clubs as a whole cannot see their way to take a stand entirely on their own, we trust some individual members will exhibit privately on their own account. No *club* exhibition (useful though they are) can possibly give a club the public advertisement that the taking of a stand at Olympia can do. Beside, in any club exhibition there is lacking that larger criticism and comparison, which can only arise when one sees them arranged side by side under the same roof. Moreover, in all exhibiting *together*, there is exhibited to the public a display not only of friendly rivalry but of comradeship on a larger scale, which is absolutely essential if model aeroplaning is to make real progress and obtain any adequate and proper recognition. At the present day one can see on every hand how futile (so far as official recognition is concerned) is individual effort—how all powerful, how instant to claim *immediate* attention is a combined body, no matter of what or whom composed. Seeing that this is such a self-evident truth, it is curious that in every walk of life, in every trade and profession and also in sport there are always those who prefer to stand aloof, to plough the lonely furrow, rather than assist in the general cultivation of the soil, which at the present day—to bear the fruit it might do—*must* be tilled and cultivated on a scientific scale, which can only be done by the *united* efforts of all those interested therein, and by a general pooling of the best results obtained by all.

We think it is not too much to say that those who stand aloof from this concerted effort cannot have the real progress of any cause at heart.

A Long-Distance Looping Model.

A correspondent (Mr. H. W. A. Thorogood) sends us the following:—"For the past six years I have been experimenting with single-propeller model aeroplanes, and have met with great success, With my latest model I have secured flights of half a mile at an altitude of 100 ft. and a duration of 60 secs. This model is 2 ft. 9 ins. by 2 ft., propelled with a 9-in. screw and 8 strands of rubber $\frac{3}{16}$ in. by $\frac{1}{32}$ in., and weighs 3½ oz. complete.

"This model will also loop the loop; on a recent occasion it made six consecutive loops, and covered a distance during this performance of a quarter of a mile. This model will fly just as well in a gale as in a calm." It is a pity Mr. Thorogood does not send us further particulars, with, say, drawings to scale, of his model, so that others could emulate its performances.

Mr. R. V. Tivy's Steam Plant.

We have received the following communication from Mr. Tivy:—"With reference to the photograph of my steam-driven model, and your interesting remarks thereon, which I see you publish this week, the account of the test with the steam plant appeared in FLIGHT some months ago, and I think you have overlooked the fact that this plant is not of the flash boiler type, but has a vertical centre flue boiler built with a cross tube and steam dome. I think I am quite right in saying that no model has yet been made to fly with a steam plant other than one of the flash boiler type, and everyone is rather prejudiced against the possibilities of centre tube boilers." Mr. Tivy is perfectly right; we had overlooked the fact to which he refers. We scarcely think, however, that everyone is prejudiced against centre tube boilers; many no doubt are so, but we have heard more than one speak in their favour. Provided that one could be made of sufficient power and small enough weight to once rise the machine, it would in some ways undoubtedly be preferable to the other type. Our correspondent has not, we presume, tried the result of an "assisted" launch. Hand-launching a power-driven model, flying (for a model) at a high speed, is impracticable, but there are, of course, other means that could be employed.

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Single screw, hand-launched	Duration	D. Driver	...	85 secs.
Twin screw, do.	Distance	R. Lucas	...	590 yards.
	Duration	G. Hayden	...	137 secs.
Single screw, rise off ground	Distance	W. E. Evans	...	290 yards.
	Duration	W. E. Evans	...	64 secs.
Twin screw, do.	Distance	L. H. Slatter	...	365 yards.
	Duration	J. E. Louch	...	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance	C. C. Dutton	...	266 yards.
	Duration	J. E. Louch	...	91 secs.
Do., off-ground	Distance	C. C. Dutton	...	190 yards.
	Duration	J. E. Louch	...	94 secs.
Single screw hydro., off-water	Duration	L. H. Slatter	...	35 secs.
Single-tractor, do., do. ...	Duration	C. C. Dutton	...	29 secs.
Twin screw, do., do. ...	Duration	L. H. Slatter	...	60 secs.

Exhibition at Felixstowe, May 6th to 16th.—The Felixstowe Advancement Association have applied for an aeronautical section to be organised in connection with their forthcoming exhibition in May next. Will any member or reader who is willing to lend models send in their names to the hon. secretary? It is hoped that a first-class exhibit will be sent, and members are asked to help the hon. sec. in this matter.

Gift of Prizes.—The Women's Patriotic Aerial League, of which The Dowager Lady O'Hagan is the chairman, has kindly offered prizes for kite and model competitions for ladies during 1914. Will others come forward and help on the science in this country?

Exhibition of Aeronautical Trophies.—Members and readers will be pleased to hear that Messrs. Gardiner and Co. (the well-known clothiers), Scotch House, Knightsbridge, are kindly exhibiting in their window till end of month the Farrow Shield of this association, also the Mappin and Webb Gold Trophy and others presented to the Grahame-White Co. for competition at Hendon.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Aero-Models Assoc. (N. Branch) (27A, SEDGEMERE AVENUE, EAST FINCHLEY, N.)
FEB. 14TH, flying at Finchley, 3 p.m. Feb. 15th, 10 a.m.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).
FEB. 15TH, flying Wanstead Flats as usual. If wet meet at clubroom. The sec. would be glad to receive at once all completed entry forms for models to be entered at Olympia.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).
FEB. 14TH, flying at Sudbury.

Reigate, Redhill and District (THE COTTAGE, WOODLANDS AVENUE, REDHILL).
FEB. 14TH, flying Earlswood Common.

Wimbledon and District (165, HOLLAND ROAD, W.).
FEB. 14TH and 15th, flying as usual.

UNAFFILIATED CLUBS.

Edinburgh Ae.S. (Model Section) (41, DRUMSHEUGH GARDENS).
THE announcement made in last week's issue of FLIGHT that "the majority of the model members of the above society have resigned their membership" is incorrect, as by far the greater majority of members have not resigned.

Finsbury and District (52, LAMBTON ROAD, HORNSEY RISE, N.).
FEB. 14TH, flying as usual Finsbury Park, 3.30 till dusk.

Ilford Model Ae.C. (83, ENDSLEIGH GARDENS, ILFORD).
FEB. 15TH, flying at 10 a.m. at Newbury Park (weather permitting). The first annual dance of the club will take place at Kensington Hall, March 4th, commencing at 8 o'clock sharp. Tickets, singles 1*s.* 6*d.*, and doubles 2*s.* 6*d.* Tickets can be obtained from the secretary.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).
FEB. 14TH, flying meetings Woolwich Common, 3 p.m. till dusk. Feb. 15th, Blackheath, 7.30 to 10 a.m.; Woolwich Common, 10.15 a.m. to 12.30 p.m. Members are requested to note that the club will hold its third exhibition on Feb. 18th, 19th, and 20th, at Albemarle College (Church House), Lennard Road, Beckenham, and members who intend exhibiting should notify the hon. secretary on or before the 17th inst.

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CORRESPONDENCE.

Automatically Stable Aeroplane.

[1837] The following is a description of an automatically stable aeroplane invented by myself and provisionally protected by Patent No. 25,364.

It will be seen from the accompanying drawings that the machine is fitted with twelve planes, two sets of four main planes and one set of four tail planes.

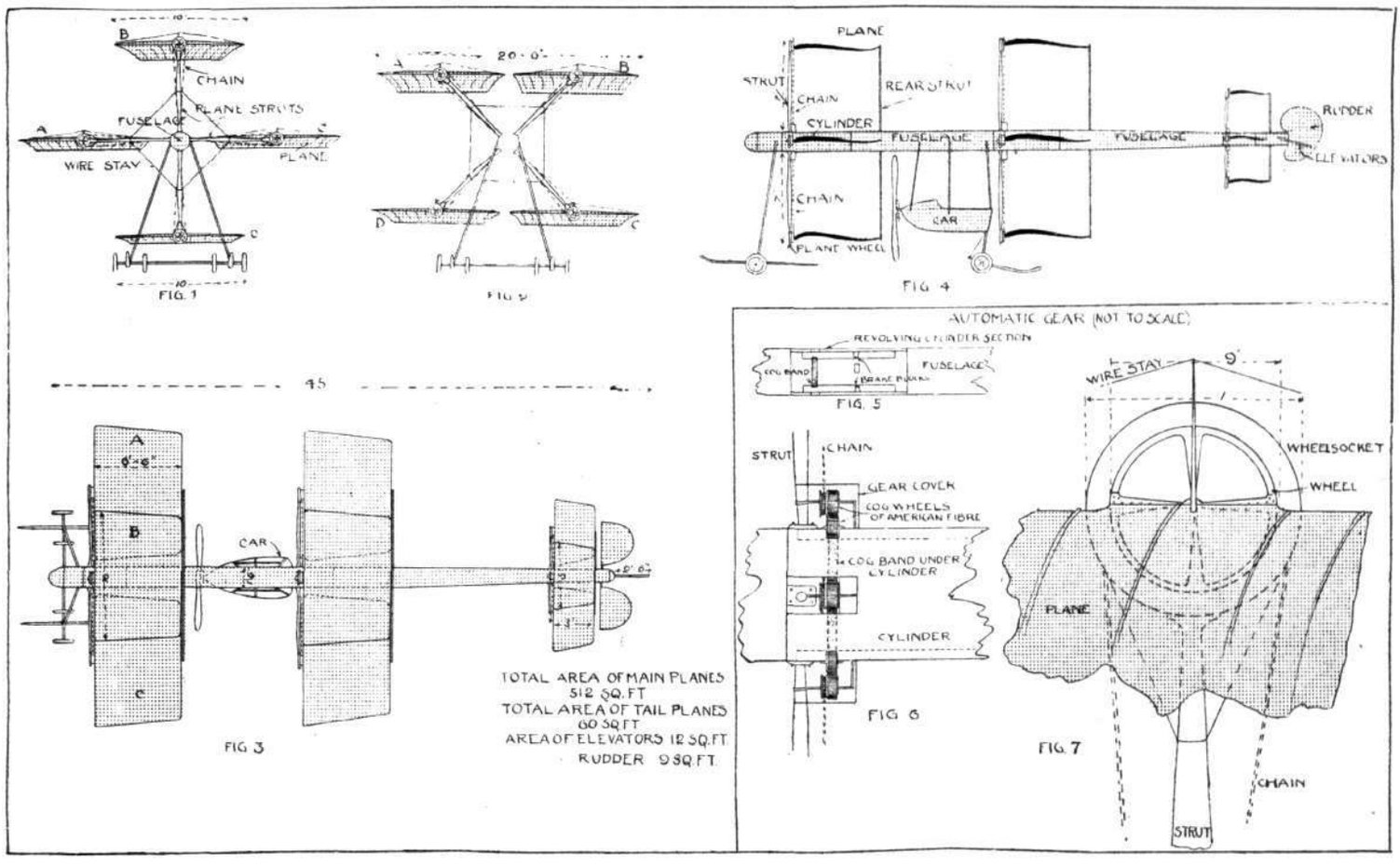
Unlike most aeroplanes the wings of this machine are not rigidly fixed direct to the *fuselage* but are placed at the end of struts, which are rigidly fixed to cylinders (skeleton cylinders covered with canvas), which are capable of revolving round the *fuselage*, thus also enabling the planes to move in a circular direction round the longitudinal axis of the machine.

Between the planes and the *fuselage* is a system of small cog wheels and chains which is brought into action by any difference of lateral pressure on the planes on either side and acts so as to equalize that pressure.

Description of Automatic Gear.—Round the *fuselage* at three certain places there is fixed a band of small cogs (Fig. 5), and over this the cylinder is fitted so that it can revolve round the *fuselage*.

On to this cylinder four plane struts are fixed at equal distances round (Figs. 1 and 2), and at the top of each strut a chain cog-wheel is fixed working in a socket as big as itself. The middle portion of the front spar of the plane forms a diagonal of the wheel to which it is rigidly fixed (Fig. 7).

At the base of each strut are two small cog-wheels of American fibre (for lightness) which are fixed as depicted in Fig. 6, the lower one passing through a hole in the cylinder and working round the cog-band on the *fuselage*. Working on the same axle as the top cog-wheel is a small flanged chain cog-wheel, which is connected to the wheel at the top of the strut by a light chain (Figs. 6, 7).



The wheel at the top of the strut has the same number of cogs on it as the cog-band round the *fuselage*, thus necessitating the *fuselage* being as narrow as possible.

This arrangement of wheels is such that as the cylinder and struts move round the *fuselage* in one direction the wheel at the top of each strut turns to exactly the same degree in the opposite direction, thus always keeping the planes in a horizontal position (*see* Figs. 1 and 2) and ensuring a constant lifting area and an equal distribution of plane surface on either side of the *fuselage*.

Now suppose a gust of wind strikes the under surface of Plane A, Fig. 1, this plane gives to the wind and moves upward and round,

and probably takes the position of Plane B, Fig. 1, allowing the gust to slide across the plane surface and out the other side, or, if it retains its grip on the plane surface, it will expend its power in position B as a lifting force instead of a capsizing one. These movements of the planes take place every time there is a difference of lateral pressure on either side of the *fuselage*, so that at one time the planes may be in the position of Fig. 1, while at another they may assume the position of Fig. 2. All three sets of planes work independently of each other.

The whole arrangement is prevented from revolving too rapidly by brakes acting on the inside of the cylinders and constantly applied to a certain degree according to the velocity and the state of the prevailing wind (*see* brake blocks, Fig. 5).

The *fuselage* is kept in position by the suspended car between the two sets of main planes. As will be seen this car will always be steady, the planes exerting no leverage upon it, and the only plane surfaces fixed to the *fuselage* being the elevator flaps and the rudder. All controls between the rudder, the elevator flaps, brakes, &c., and the car, pass through the centre of the *fuselage* so as not to foul the working of the planes.

Brighton. PERCY PARKER.

[Although an arrangement of the main planes of a machine like that suggested by Mr. Parker might possibly possess automatic lateral stability, there are several theoretical and constructional difficulties which would, we think, render the value of such an arrangement a doubtful one. In the first place the method of supporting the main planes does not appear to be very satisfactory, as each plane is mounted on a cantilever beam which would have to be of immense strength and which would consequently be very heavy. Secondly, as at present arranged, the centre of thrust seems to be far too great a distance below the centre of gravity. This might possibly be remedied by placing the propeller in the nose of the *fuselage*, but this arrangement would entail extra gearing and long shafts, which would be difficult to mount on account of the long revolving *fuselage*, and which would—even supposing it is constructionally possible—add very considerably to the weight of the machine.

There would also seem to be considerable difficulty in transmitting the thrust from the suspended car to the *fuselage*, as direct bracing by means of cables or wires to the *fuselage* obviously cannot be employed owing to the revolving plane struts which would foul the cables. The only method available seems to be diagonal bracing of the struts by means of which the car is suspended from the *fuselage*, and this does not seem adequate for the purpose. Another point which has, however, nothing to do with the stability of the machine, is the arrangement of the chassis. One cannot quite understand how the nose of the machine can be raised off the ground on starting, as one imagines that the centre of gravity is situated forward of the rear pair of wheels. However, a different type of chassis would remedy this point, so we will turn our attention in another direction.

Owing to the comparatively small length of the individual planes, which have a very low aspect ratio, the lift would be very small due to end losses so that although the total area of the main planes is stated to be 512 sq. ft., the load per sq. ft. which planes of this type would support would probably not be anything near as great as that supported by two planes of the usual type and of the same total area.—ED.]

The R.A.F. and the Industry.

[1838] "Octopus" and others appear to take the view that "if the R.A.F. is to have the slightest control of the buying, then they must not design or make aeroplanes," as he puts it. Why not? It is the practice of all other Government departments, not only of our own, but all other of the principal powers. It is also the practice of all the large and successful commercial concerns. No individual firm or Government makes everything it requires from the original ore, &c., and they therefore buy things more or less completely finished. They endeavour to find what suits them, and then insist on its being supplied. The larger the firm or Government, the larger their experimental staff, and the more detailed the drawings and specifications, which have to be worked to, but the *principle* is worked to by everyone, even in the smallest things. There appears no reason whatever why the Government should not do the best they can to find what is most suitable in the way of aeroplanes for Army work and then buy them. This is the practice in Naval control and has worked well on the whole. At least it has made our Navy much respected, while contractors' profits have been good in the case of well managed firms. I don't quite understand "Octopus'" remarks as to judges' own machines competing in competitions. What competition and what machine does he refer to?

Malton. F. STRICKLAND.

Olympia Exhibition.

As there appears to be some confusion as to the dates of the forthcoming Aero and Marine Exhibition, we are asked to make it clear that the exhibition will open on Monday, March 16th, and close in the evening of the following Wednesday week, March 25th.

Cellon in the Antipodes.

IT may be recalled that the Sopwith "Tabloid" biplane, which Mr. H. G. Hawker has taken with him to Australia, and which put up such wonderful performances before leaving this country, is doped with Cellon. Consignments of Cellon have also been sent to the Australian Government and to Mr. J. R. Duigan, so that there should be quite a number of machines in Australia using this well-known dope.

Gamage Athletics at Dinner.

ONE of the most cheery functions which it has been our lot to attend was the second annual gathering of the Gamage Amateur Athletic Association at the Holborn Restaurant on Saturday last. There were over 600 members of the staff with their wives and friends present, so that the King's Hall was completely filled. Mr. A. W. Gamage was in the chair, supported by practically all the family. The various toasts were eloquently proposed and responded to, especially that of "The Visitors," which was proposed by Mr. Parker, and responded to by Mr. W. S. Edwards. An excellently-arranged musical entertainment made the evening pass all too quickly.

IMPORTS AND EXPORTS, 1913-1914.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see FLIGHT, January 25th, 1912, and for 1912 and 1913, see FLIGHT for January 17th, 1914:—

	Imports.		Exports.		Re-Exportation.	
	1913.	1914.	1913.	1914.	1913.	1914.
	£	£	£	£	£	£
January	12,097	5,945	4,005	210	1,510	879

NEW COMPANY REGISTERED.

Premier Airships Synd., Ltd.—Capital £2,000, in £1 shares. Manufacturers of and dealers in airships and flying machines of all kinds, &c.

Aeronautical Patents Published.

Applied for in 1913.

Published February 5th, 1914.

2,512. E. HYRA AND K. KLINHOSCHE. Illuminating devices for airships.
10,142. T. MOORE. Safety shield for airmen.
11,792. C. D. O. VOLLMANN. Aerial machines.
12,372. G. MEES. Floats for aircraft.
12,804. E. VON PETROCZY. Aeroplanes.

Published February 12th, 1914.

1,307. C. B. THOMAS. Stabilising device for aeroplanes.
2,895. R. R. GRANT AND C. O. MORSE. Aeroplanes.
5,003. C. R. FLEMING-WILLIAMS. Hydro-aeroplanes.
6,264. E. DULIER. Aeroplanes.
14,036. F. RIOTTE. Aerial machines.
14,838. M. ROGLER. Airship shelters.
15,265. J. R. GAMMETER. Aerostats.
17,435. H. PODOLSKY. Aeroplanes.
18,109. C. R. AND A. D. WITTEMANN. Flying machines.
19,933. H. E. S. HOLT. Aerial illuminating devices.
22,764. L. SINAVE. Aerial machines.

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